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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

October 4, 1977 Volume 963 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of August 1977

Affirmed	208
Affirmed in Part	25
Reversed	79
Total	312

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,600,240, B. C. Grieb, CONSTRUCTION OF INCUBATORS FOR INFANTS; **2,648,327,** S. Y. GIBON, INFANT INCUBATOR EQUIPMENT; **2,778,617,** same, COMPARTMENT HUMIDIFIER; **3,335,712,** Grosholz and Wallace, INFANT INCUBATOR; **3,338,233,** Grosholz and Andreasen, INCUBATOR TEMPERATURE CONTROL SYSTEM AND METHOD OF OPERATION, **filed** Oct. 13, 1967, D.C., N.D. Ill. (Chicago) Doc. 67c1767, *Air-Shields and Children's Hospital of Philadelphia* v. *Ohio Chemical & Surgical Co., Division of Air Reduction Company, Inc.* Judgment, U.S.D.C. on defendant's motion for judgment granted, Mar. 30, 1971; judgment affirmed, Mar. 23, 1973.

2,648,327. (See 2,600,240.)

2,778,617. (See 2,600,240.)

2,848,914, S. Gottfried, WIRE STRIPPING DEVICE; **2,921,511,** C. Vinten, CONTROL OF THE IRIS APERTURE SIZE IN PHOTOGRAPHIC CAMERAS; **2,931,284,** same, CURTAIN SHUTTER FOR CAMERAS, **filed** Feb. 9, 1976, United States Court of Claims (District of Columbia) Doc. 36–76, *W. Vinten Limited* v. *The United States and Mitchell Camera Corp.* Order, the third party defendant's motion for summary judgment be granted and the plaintiff's petition is dismissed. The Third party defendant's counterclaim is disallowed and dismissed, Apr. 26, 1977.

2,921,511. (See 2,848,914.)

2,931,284. (See 2,848,914.)

3,077,724, Stoddard and Seem, APPARATUS FOR PROCESSING YARNS; **3,091,912,** same, METHOD OF PROCESSING STRETCH YARN AND YARNS PRODUCED THEREBY; **3,472,011,** E. P. R. Scragg, TREATMENT OF ARTIFICIAL YARNS AND THREADS, **filed** Nov. 30, 1976, D.C., S.D. Fla. (Miami) Doc. FL–76–6514–C–JLK, *Collins & Aikman Corporation* v. *Lex Tex Ltd., Inc.*

3,091,912. (See 3,077,724.)

3,140,342, Ehrreich and Avery, ELECTRICAL SHIELDING AND SEALING GASKET; **3,583,930,** same, PLASTICS MADE CONDUCTIVE WITH COARSE METAL FILLERS, **filed** Jan. 14, 1977, D.C. Del. (Wilmington) Doc. 77–21, *Metex Corporation* v. *Chomerics, Inc.*

3,204,495, J. J. Matthews, INSULATION REMOVING TOOL; **3,572,189,** same, INSULATION JACKET SHAVING TOOL, **filed** Mar. 8, 1977, D.C. Conn. (Hartford) Doc. H77–119, *Utility Tool Corp.* v. *Ideal Industries Inc. and Hartford Electric Supply Co.*

3,217,546, Cordell and Gustafson, AUTOMATIC GRAIN SAMPLING DEVICE; **3,217,549,** same, AUTOMATIC SAMPLING DEVICE; **3,383,924,** R. R. Cordell, RETRACTABLE DEVICE FOR PRESSURIZED CONVEYORS, **filed** June 4, 1976, D.C., S.D. Iowa (Des Moines), Doc. 76–192–L, *Gustafson, Inc.* v. *Corn States Hybrid Service, Inc.* Judgmeent for plaintiff and against defendant for infringement of patents and except as to extent permitted by terms of writen agreement of Feb. 16, 1977, where plaintiff granted defendant a licenes under said patents. Defendants are permanently enjoined against infringing or contributing to infringement of any claim of said patent during unexpired term, Mar. 28, 1977.

3,217,549. (See 3,217,546.)

3,219,261, N. Laing, CROSS-FLOW FAN ROTOR SUPPORT MEANS; **3,284,611,** same, PORTABLE HAIR DRYERS; **3,295,750,** same, CROSS FLOW MACHINE; **3,305,665,** same, FORCED CIRCULATION ELECTRIC HEATER EMPLOYING CROSS-FLOW TYPE FAN; **3,308,268,** same, PORTABLE HAIR DRYERS; **3,310,228,** same, FLOW MACHINES; **3,313,342,** same, BLOWERS; **3,319,877,** Eck and Laing, MACHINES OF THE CROSS-FLOW TYPE FOR INDUCING MOVEMENT OF FLUID; **3,322,332,** N. Laing, CROSS FLOW MACHINE; **3,322,932,** same, PORTABLE ELECTRIC FAN HEATER; **3,348,020,** B. Cooper, HAND-HELD ELECTRIC HAIR DRYER, **filed** Oct. 23, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c3048, *Schick Incorporated* v. *Firth Cleveland Ltd. et al.* Enter stipulation of dismissal under FRCP Rule 41(a)(1)(ii), Apr. 15, 1976.

3,275,316, G. V. Cleary, Jr., INSERT FOR NEWSPAPERS, **filed** Apr. 30, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1653, *Free Standing Stuffer, Inc.* v. *LaSalle Extensions University.* **Same, filed** Apr. 28, 1972, D.C., N.D. Ill. (Chicago) Doc. 72c1070, *Free Standing Stuffer, Inc.* v. *Holly Development Co.* Defendant is permanently enjoined and restricted from directly or indirectly infringing said patent. Final order was appealed and appeal was dismissed, Sept. 24, 1976.

3,284,611. (See 3,219,261.)

3,291,004, Stevens and Ostgaard, PNEUMATIC BRAKE SETTING MEANS WITH EMERGENCY MECHANICAL ACTUATOR THEREOF; **3,359,869,** W. C. Avrea, FLUID OPERATED BRAKE, **filed** June 21, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c1704, *Royal Industries, Inc.* v. *Acme Parts & Supply Corp.* Entered final judgment by consent, Oct. 28, 1975.

3,295,750. (See 3,219,261.)

3,303,615, L. O'Neal, INFLATABLE DOCK SEAL; **3,391,502,** same, DOCK SEAL, **filed** Apr. 23, 1976 (United States Court of Claims) Doc. 159–76, *Larry O'Neal and O'Neal Tarpaulin & Awning Company* v. *The United States of America.*

3,305,665. (See 3,219,261.)

3,308,268. (See 3,219,261.)

3,310,228. (See 3,219,261.)

3,313,342. (See 3,219,261.)

3,319,877. (See 3,219,261.)

3,321,202, M. D. Martin, AUTOMATIC SHEET STACKERS; **3,658,322,** same, METHOD AND APPARATUS FOR HANDLING SHEETS; **3,880,420,** same, CONVEYOR SYSTEM FOR CONVEYING SHEETS; **3,912,258,** same, **filed** Dec. 13, 1976, D.C.N.J. (Newark) Doc. 76–2360, *Molins Machine Company, Inc.* v. *Merrill D. Martin and Geo. M. Martin Company.*

3,322,332. (See 3,219,261.)

3,322,932. (See 3,219,261.)

3,335,713. (See 2,600,240.)

3,338,233. (See 2,600,240.)

3,348,020. (See 3,219,261.)

3,359,869. (See 3,291,004.)

3,383,924. (See 3,217,546.)

3,391,502. (See 3,305,615.)

3,472,011. (See 3,077,724.)

3,572,189. (See 3,204,495.)

3,583,930. (See 3,140,342.)

3,658,322. (See 3,321,202.)

3,717,963, J. T. Sauriol, METER HOUSING; **Re. 28,640,** same, **filed** Sept. 29, 1975, D.C., N.D. Tex. (Dallas) Doc. CA3–75–1195, *Roby Industries, Inc.* v. *Bass & Hayes Foundry, Inc. and Polyfoam, Inc.* Final judgment on consent, defendant enjoined and restrained from infringing upon said patent and reissue patent. Defendant's counterclaim herein is dismissed with prejudice, May 8, 1977.

3,725,704, Buchanan, Tecotzky and Wickersheim, RARE EARTH PHOSPHORS FOR X-RAY CONVERSION SCREENS; **3,829,700,** same, **filed** May 16, 1977, D.C., N.D. Calif. (San Francisco) Doc. C77–1020, *Lockheed Missiles & Space Company, Inc.* v. *Eastman Kodak Co. and Professional Electric X-Ray Co.*

3,739,994, A. R. McFarland, APPARATUS FOR PRODUCING DE-BONED MEAT PRODUCTS; **3,741,772,** same, PROCESS FOR PRODUCING DE-BONED MEAT PRODUCTS; **3,906,118,** same, PROCESS FOR DE-BONING MEAT OR FISH, **filed** Apr. 6, 1977, D.C. Utah (Salt Lake City) Doc. C–77–0109, *Beehive Machinery, Inc.* v. *Meat Separator Corporation, A. H. Lang and Lang & Assoc., Inc.*

3,741,772. (See 3,739,994.)

3,749,003. Wilkes and Jones, SEED COTTON HANDLING APPARATUS, filed May 20, 1977, D.C., E.D. Calif. (Fresno) Doc. F-77-94, *Cotton Incorporated* v. *Taylor Machinery Corp. and Clyde L. Taylor.*

3,753,364. Runyan and Groover, HEAT PIPE AND METHOD AND APPARATUS FOR FABRICATING SAME; **3,788,388,** H. G. Barkmann, HEAT EXCHANGE SYSTEM; **3,865,184,** G. M. Grover, HEAT PIPE AND METHOD AND APPARATUS FOR FABRICATING SAME, filed Nov. 24, 1976, D.C., N.D. Tex. (Dallas) Doc. CA3-76-1527-D, *Q-Dot Corp.* v. *American Air Conditioning Corp.*

3,757,049. Bonsky and Curtis, TELEPHONE ANSWERING INSTRUMENT AND SYSTEM; **3,865,986,** J. R. Darwood, VOICE OPERATED ELECTRIC CIRCUIT; **3,903,369,** same, TELEPHONE ANSWERING SYSTEM WITH REMOTE PLAYBACK; **3,968,329,** same, TELEPHONE ANSWERING APPARATUS; **3,991,274,** same, TELEPHONE ANSWERING SYSTEM WITH ONE RESPONSIVE CIRCUIT FOR REMOTE PLAYBACK, filed Jan. 11, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-107-Lew, *Phone-Mate Inc.* v. *T. A. D. Avanti, Inc.*

3,762,648. Denies, Trenary, Smith and Hickman, SPRAY NOZZLE; **3,801,019,** Trenary and Smith, same, filed Mar. 10, 1977, D.C., W.D. Okla. (Oklahoma City) Doc. 77-0233-E, *Teledyne Industries, Inc., doing business as Teledyne Water Pik* v. *Dillard Department Stores, Inc.*

3,785,388. (See 3,753,364.)

3,799,379. Grether and Kelton, FORK LIFT, filed Apr. 27, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c1473, *Tobias Grether and William J. Kelton* v. *Foxcroft Meadows, Inc.*

3,801,019. (See 3,762,648.)

3,803,731. R. H. Zumbro, SHOES, filed July 10, 1975, D.C., S.D.N.Y., Doc. 75-3388, *Uniroyal, Inc.* v. *CITC Industries, Inc.* Consent judgment, above Letter's Patent is invalid for want of invention over the prior art pursuant to Title 35 U.S.C. 103, May 19, 1977.

3,808,943. L. Kelly, GUN-LEVELING DEVICE; **Reg. No. 1,024,887** (MAG-NA-PORT), Mag-Na-Port Arms, Inc., filed Mar. 29, 1977, D.C., S.D. Fla. (Fort Lauderdale) Doc. 77-1023-C-NCR, *Mag-Na-Port Arms, Inc.* v. *Universal Sporting Goods, Inc.*

3,826,068. Ballas and Geist, ROTARY CUTTING ASSEMBLY; **3,859,776,** same, filed May 26, 1977, D.C., W.D. Wis. (Madison) Doc. 77-C-204, *Weed Eater, Inc.* v. *The Toro Company and Toro Sales Company, Inc.*

3,829,700. (See 3,725,704.)

3,859,776. (See 3,826,068.)

3,865,184. (See 3,753,364.)

3,865,986. (See 3,757,049.)

3,880,420. (See 3,321,202.)

3,903,369. (See 3,757,049.)

3,906,118. (See 3,739,994.)

3,912,258. (See 3,321,202.)

3,948,680. Mao and Sabatino, LEAD-ACID STORAGE BATTERY CAPABLE OF ACTIVATION BY THE ADDITION OF ELECTROLYTE; **3,988,165,** same, METHOD OF MAKING A LEAD-ACID STORAGE BATTERY, AND CELL CAPABLE OF ACTIVATION BY THE ADDITION OF ELECTROLYTE, filed Mar. 1, 1977, D.C. Del. (Wilmington) Doc. 77-73, *Gould Inc.* v. *Northwest Industries, Inc. and General Battery Corp.*

3,968,329. (See 3,757,049.)

3,988,165. (See 3,948,680.)

3,991,274. (See 3,757,049.)

3,994,240. Berg, Luger and Olsen, COIL CAR COVER, filed May 10, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c1640, *Proform, Inc.* v. *Choo-Choo Products Ltd.*

Re. 28,640. (See 3,717,963.)

D. 245,110. R. V. Friesen, DOLL HOUSE, filed Apr. 6. 1977, D.C. Utah (Salt Lake City), Doc. C-77-0110, *Roy V. Friesen* v. *M. Joseph Long and Nancy H. Long, doing business as The Woodhouse.*

Reg. No. 1,024,887. (See 3,808,943.)

Public Hearing on Relocation of Offices

During the past eighteen months, the Patent and Trademark Office has been attempting to acquire additional office space. The PTO's Public Search Room for Patents currently lacks file expansion capability and its Patent Documentation staff has been seriously overcrowded for some time with some of the staff being located at an adjacent office complex.

Past efforts to locate space in the Crystal City area have not been successful and it appears unlikely that space will become available in this area within the foreseeable future. The General Services Administration recently offered the PTO approximately 36,000 square feet of space in the top four floors of a modern office building which is located at 1000 N. Glebe Road in Arlington, at the intersection of Glebe Road and Fairfax Drive and between Wilson Boulevard and Washington Boulevard. This site, which is approximately five miles from the PTO's Crystal Plaza location, is readily accessible by public transportation. In view of the PTO's urgent need for space, and after careful consideration of all possible alternatives, it has been decided to accept this offer of additional space.

Affected employees and members of the public will have an opportunity to comment before a decision is made on the units to move to the Glebe Road building. Two options are currently being considered and in each instance the number of employees involved is approximately 170. The first consists of shifting most trademark-related functions and the Board of Patent Interferences. The other option would include the Board of Appeals, the Office of Publications and the Board of Patent Interferences.

A public hearing on this subject will be held on October 7, 1977 in the Jefferson Room of the Hospitality House Motor Inn, 2000 Jefferson Davis Highway, Arlington, Virginia. The meeting will commence at 10:00 A.M. and terminate not later than 3:00 P.M. Individuals who wish to participate in this meeting should contact Bradford R. Huther (703) 557-2290 by noon, October 6, 1977.

Sept. 22, 1977. LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,453,054, Re. S.N. 821,611, Filed Aug. 3, 1977, Cl. 356/237, SYSTEM FOR DETECTING SMALL OPENINGS IN HOLLOW BODIES, Bryce W. Phillips, Owner of Record: *Reynolds Metals Company, Richmond, Va.,* Attorney or Agent: John F. C. Glenn, et al., Ex. Gp.: 257

3,609,788, Re. S.N. 818,985, Filed July 25, 1977, Cl. 15/104.3, PLUMBERS' TOOL, Mark F. Mier, Owner of Record: *Inventor,* Attorney or Agent: James E. Brunton, Ex. Gp.: 242

3,833,363, Re. S.N. 812,881, Filed July 5, 1977, Cl. 75/175.5, TITANIUM-BASE ALLOY AND METHOD OF IMPROVING CREEP PROPERTIES, Howard B. Bomberger, Jr., et al., Owner of Record: *RMI Company, Niles, Ohio,* Attorney or Agent: Forest C. Sexton, Ex. Gp.: 111

3,899,136, Re. S.N. 822,082, Filed Aug. 5, 1977, Cl. 239/534, EMITTER FOR IRRIGATION SYSTEMS, Richard C. Harmony, Owner of Record: *Harmony Emitter Company, Inc., Tucson, Ariz.,* Attorney or Agent: C. Robert Von Hellens, et al., Ex. Gp.: 313

3,914,864, Re. S.N. 822,835, Filed Aug. 8, 1977, Cl. 30/90.6, JACKETED WIRE LAYER REMOVING TOOL, Jack Henry Prince, Owner of Record: *Inventor,* Attorney or Agent: James B. Kinzer, et al., Ex. Gp.: 323

3,928,245, Re. S.N. 822,623, Filed Aug. 8, 1977, Cl. 252/521, METAL OXIDE VOLTAGE-VARIABLE RESISTOR COMPOSITION, Herbert Fishman, et al., Owner of Record: *General Electric Company, Pittsfield, Mass.*, Attorney or Agent: Francis X. Doyle, et al., Ex. Gp.: 223

3,986,752, Re. S.N. 821,317, Filed Aug. 2, 1977, Cl. 308/137, RESILIENT CENTER BEARING ASSEMBLY, William Henry Bogar, et al., Owner of Record: *E. I. Du Pont de Nemours and Company, Wilmington, Del.*, Attorney or Agent: Robert E. Patridge, Ex. Gp.: 316

3,990,822, Re. S.N. 806,451, Filed June 14, 1977, Cl. 425/25, MECHANISM FOR MAINTAINING ALIGNMENT BETWEEN TWO RELATIVELY MOVABLE MEMBERS, Kenneth T. MacMillan, Owner of Record: *Inventor,* Attorney or Agent: Charles E. Brown, et al., Ex. Gp.: 322

3,997,458, Re. S.N. 821,963, Filed Aug. 4, 1977, Cl. 252/89 R, METHOD OF CLEANSING CONTAMINATED WOUNDS AND SURGICAL SCRUB SOLUTIONS FOR SAME SCRUB, Leonard D. Kurtz, Owner of Record: *Deknatel, Incorporated, Long Island, N.Y.*, Attorney or Agent: Roberts B. Larson, et al., Ex. Gp.: 165

PATENT NOTICES

Certificates of Correction for the Week of Oct. 4, 1977

Re. 28,419	4,013,354	4,027,720	4,031,995
Re. 29,282	4,013,514	4,027,837	4,032,011
3,647,531	4,013,930	4,027,932	4,032,168
3,699,070	4,014,358	4,028,130	4,032,209
3,790,535	4,014,715	4,028,138	4,032,213
3,851,829	4,014,773	4,028,160	4,032,235
3,871,656	4,014,951	4,028,205	4,032,290
3,909,652	4,015,126	4,028,264	4,032,303
3,915,959	4,015,260	4,028,409	4,032,431
3,919,502	4,015,550	4,028,635	4,032,488
3,922,322	4,015,564	4,028,865	4,032,791
3,928,255	4,015,894	4,029,162	4,032,852
3,932,265	4,016,079	4,029,163	4,032,927
3,933,180	4,016,096	4,029,287	4,032,946
3,945,852	4,016,448	4,029,314	4,033,005
3,946,202	4,016,475	4,029,520	4,033,025
3,948,497	4,017,108	4,029,523	4,033,215
3,952,643	4,017,527	4,029,531	4,033,355
3,953,103	4,018,607	4,029,573	4,033,400
3,957,691	4,019,106	4,029,576	4,033,444
3,957,844	4,019,291	4,029,592	4,033,487
3,960,754	4,019,490	4,029,702	4,033,490
3,962,140	4,019,546	4,029,709	4,033,562
3,964,934	4,020,711	4,029,829	4,033,577
3,965,072	4,021,946	4,029,925	4,033,689
3,967,072	4,022,566	4,030,207	4,033,777
3,973,189	4,022,601	4,030,208	4,033,858
3,973,199	4,022,765	4,030,209	4,033,900
3,981,453	4,022,779	4,030,402	4,033,910
3,981,913	4,023,673	4,030,428	4,034,017
3,985,316	4,023,780	4,030,581	4,034,207
3,986,915	4,023,856	4,030,604	4,034,232
3,989,905	4,023,869	4,030,610	4,034,473
3,990,204	4,023,998	4,030,619	4,034,490
3,990,576	4,024,533	4,030,625	4,034,498
3,991,869	4,024,705	4,030,628	4,034,561
3,992,148	4,024,851	4,030,653	4,034,738
3,996,308	4,024,852	4,030,719	4,034,741
4,000,142	4,024,875	4,030,722	4,034,792
4,001,073	4,024,883	4,030,806	4,034,947
4,002,420	4,024,930	4,030,885	4,035,044
4,003,764	4,025,292	4,030,908	4,035,244
4,004,573	4,025,399	4,030,917	4,035,338
4,007,247	4,025,454	4,030,921	4,035,566
4,008,035	4,025,759	4,031,002	4,035,655
4,008,801	4,025,926	4,031,050	4,035,679
4,008,994	4,026,041	4,031,051	4,035,719
4,009,058	4,026,096	4,031,147	4,035,827
4,009,111	4,026,197	4,031,244	4,035,905
4,009,904	4,026,259	4,031,340	4,036,576
4,010,148	4,026,704	4,031,523	4,036,769
4,010,382	4,026,891	4,031,604	4,036,919
4,010,798	4,026,996	4,031,614	4,037,029
4,011,060	4,027,017	4,031,634	4,037,196
4,011,238	4,027,519	4,031,825	4,037,202
4,011,351	4,027,525	4,031,902	
4,012,880	4,027,531	4,031,914	
4,013,158	4,027,599	4,031,954	

Disclaimers

3,292,341.—*James D. Frost*, Porterville, Calif. ORIENTING AND PACKING APPARATUS. Patent dated Dec. 20, 1966. Disclaimer filed Jan. 10, 1977, by the inventor.

Hereby enters this disclaimer to all claims of said patent.

3,500,063.—*Charles William Renon*, Haddonfield, N.J., and *Richard James Tarzaiski*, Philadelphia, Pa. SCANNING LASER OBSTRUCTION DETECTION SYSTEM UTILIZING RETROREFLECTIVE STRIP. Patent dated Mar. 10, 1970. Disclaimer filed Aug. 8, 1977, by the assignee, *RCA Corporation*.

Hereby enters this disclaimer to the remaining term of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF AUGUST 27, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-30-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-17-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	6-1-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-21-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	10-6-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	7-26-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	6-7-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	8-17-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	3-8-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	6-25-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	1-15-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	10-5-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	11-24-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	9-3-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	9-16-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	1-3-77

Expiration of patents: The patents within the range of numbers indicated below expire during August 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,947,001 to 2,951,248, inclusive

Plant Patents..... Numbers 1,963 to 1,969, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED OCTOBER 4, 1977

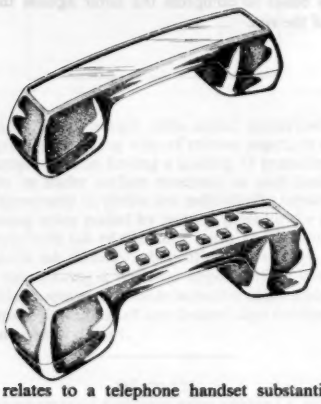
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T963,001
TELEPHONE HANDSET

Joseph Robert Everhart, Holmdel; Donald Michael Genaro, Haworth; Rembert Ryan Stokes, Middletown, all of N.J.; Gordon Elliot Sylvester, Jamaica, N.Y., and Alvin Richard Tilley, Red Bank, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 30, 1976, Ser. No. 718,853
Int. Cl. D14 *03*
U.S. Cl. 14—63
3 Sheets Drawing. 1 Pages Specification

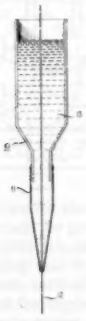


The design relates to a telephone handset substantially as shown.

T963,002
COATING OF FIBER WAVEGUIDES

Robert Vincent Albarino, Summit, and Arthur Clifford Hart, Jr., Chester, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 30, 1976, Ser. No. 701,302
Int. Cl.[2] C03B *37/02*
U.S. Cl. 65—3 R
2 Sheets Drawing. 2 Pages Specification

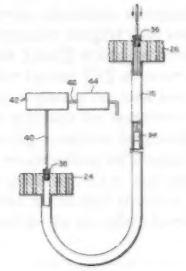


The specification describes coating techniques for glass fiber waveguides that avoid physical contact of the fiber by anything other than the coating solution. The techniques depend on the use of very flexible easily deformable materials for the exit die of flooded die applicators.

T963,003
METHOD AND APPARATUS FOR LOCATING A DEFECTIVE TUBE OF A LIQUID METAL-TO-WATER TUBE TYPE HEAT EXCHANGER

Steven L. Schrock, and James D. Mangus, both of Greensburg, Pa., assignors to Westinghouse Electric Corportion, Pittsburgh, Pa.

Filed Apr. 12, 1976, Ser. No. 676,179
Int. Cl.[2] G01M *3/20*
U.S. Cl. 73—40.7
3 Sheets Drawing. 23 Pages Specification



A method and apparatus for detecting a specific leaking tube or tubes and for detecting the position of a defect within a tube in a liquid metal-to-water tube type heat exchanger, generally used in a sodium cooled nuclear reactor. Subsequent to draining of the heat exchanger a solid reaction product of the liquid metal and water forms at a leak location. Introducing an inert gas to the exterior of the tubes, creating a pressure differential across the tube wherein the interior pressure is less than the exterior pressure, and heating the tube, provide dissociation and isolation of the reaction product, which, when analyzed for chemical content, indicates which tube or tubes is defective. A heat probe apparatus which traverses the interior of the tubes may be used in the heating step, which, as a result of the speed of the dissociation process at high temperatures provides a means for detecting the specific leak location within the tube. A heat apparatus which traverses the exterior of bayonet type tubes may be used in another embodiment.

T963,004

RUN-FLAT SYSTEM FOR A VEHICLE WHEEL

Warren A. Van Wicklin, Jr., Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

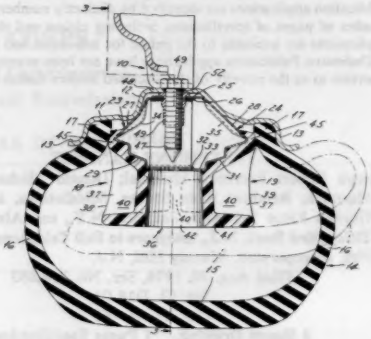
Continuation of Ser. No. 670,476, March 25, 1976. This application Feb. 28, 1977, Ser. No. 772,401

Int. Cl.² B60C *17/00*

U.S. Cl. 152—158

2 Sheets Drawing. 10 Pages Specification

A run-flat system comprising, in combination, a vehicle wheel having a tubeless tire mounted thereon and a run-flat support structure within the tire comprising a plurality of arcuate segments interposed between the rim of the wheel and the tread section of the tire. The segments are fastened to the rim and in normal inflated condition of the tire are radially spaced from the tire tread section. The improvement comprises each arcuate segment having an elongated hollow base section seated in the drop center channel of the wheel rim, side walls extending outwardly from the base wall toward the tubeless tire retention beads, and a compression resistant wall spanning the segment base section side walls. An energy absorbent elastomeric arcuate liner externally covers the upper section of the segment base section, the liner extending over the side edges of the segment base section in abutting relation to the retention beads to compress the latter against the retention flanges of the rim.



REISSUES

OCTOBER 4, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

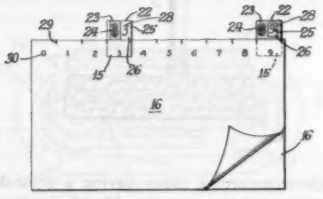
Re. 29,422
INDEX TABS

Walter F. Cunningham, Des Plaines, Ill., assignor to Superior Tabbies, Incorporated, Elk Grove Village, Ill.

Original No. 3,805,426, dated Apr. 23, 1974, Ser. No. 339,984, Mar. 12, 1973. Application for reissue Apr. 12, 1976, Ser. No. 675,817

Int. Cl.[2] A44C *3/00*

U.S. Cl. 40—2 R 8 Claims



1. A strip of 10 two-digit color coded numerical indexing tabs, comprising a backing strip of release paper, an overlying strip of transparent film having a coating of pressure-sensitive adhesive on its under surface mounted on said backing strip and cut transversely to define ten individually separable tabs, said tabs being color coded by reverse printing the same first digit on each with ink of the same color and leaving a blank space on each tab directly adjacent said first digit, and said overlying strip having a write-on upper surface coterminous with said blank spaces to enable selective application in each sad blank space during use of any desired digit for display with the adjacent said first digit.

Re. 29,423
TIME CORRECTION DEVICE FOR DIGITAL WATCHES

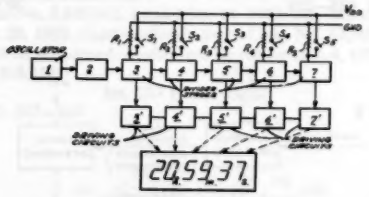
Kinji Fujita, Shimosuwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Original No. 3,717,990, dated Feb. 27, 1973, Ser. No. 208,311, Dec. 15, 1971. Application for reissue Feb. 26, 1975, Ser. No. 553,347

Claims priority, application Japan, Dec. 17, 1970, 45-112397

Int. Cl.[2] G04B *19/30*; G04C *3/00*; G04B *27/00*

U.S. Cl. 58—50 R 12 Claims



1. A time correction device for electronic watches including time standard oscillator means for producing a high frequency signal, and multi-stage divider circuit means coupled to said oscillator means for dividing said high frequency signal into low frequency timing signals, each of said divider means stages producing an output signal for application to the input of the next stage, comprising a gate means connected to the input of each divider means stage to be corrected for selectively applying to said input either the output signal of the prior divider means stage or the inverse thereof; and manually operated switch means operatively coupled to said gate means for the selection of which of said prior divider means stage output signal or the inverse thereof is passed by said gate means to the input of the divider means stage to be corrected.

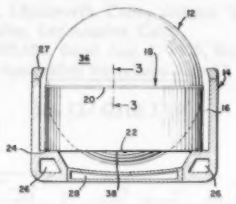
Re. 29,424
TANK CONSTRUCTION FOR LIQUIFIED AND/OR COMPRESSED GAS

Ragnar Bognaes, Jeloy, and Olav Solberg, Oslo, both of Norway, assignors to Kvaerner Brug AS, Oslo, Norway

Original No. 3,677,021, dated July 18, 1972, Ser. No. 81,102, Oct. 15, 1970. Application for reissue Dec. 21, 1976, Ser. No. 752,896

Int. Cl.[2] F17C *13/08*

U.S. Cl. 62—55 17 Claims



1. In a cargo tank *having at least one curvilinear peripheral surface and being* adapted to contain liquified gas [and which is], *said tank being* mounted by a supporting structure extending tangentially to the tank in a marine vessel for transportation thereby or for storage, means for connecting said tank to said [support] *supporting* structure, comprising, a one piece peripheral support member integral with and forming an annular portion of said tank [and] *at said curvilinear peripheral surface, said support member* having [a] *an inner surface which forms a portion of the inner surface of the tank and an extension* portion extending beyond said tank for operative connection with said [support] *supporting* structure tangentially of the tank; *said supporting structure comprising an integral skirt having opposed ends respectively rigidly secured to said extension portion of the support member and to the hull structure of the vessel; thereby eliminating the need for the secondary barrier normally used with LNG cargo tanks.*

Re. 29,425
TRASH COMPACTOR AND BAG SYSTEM

Einar O. Engebretsen, Troy, Ohio, assignor to Hobart Corporation, Troy, Ohio

Original No. 3,756,144, dated Sept. 4, 1973, Ser. No. 214,804, Jan. 3, 1972. Continuation-in-part of Ser. No. 184,038, Sept. 27, 1971, Pat. No. 3,807,299. Application for reissue Jan. 7, 1976, Ser. No. 647,162

Int. Cl.[2] B30B *15/30*

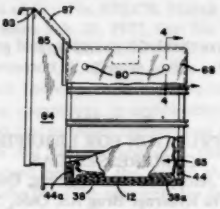
U.S. Cl. 100—215 5 Claims

1. [For use in] *In* a trash compactor having a housing, a ram mounted in said housing and including a reciprocating drive therefor, and a container having rigid walls positionable in said housing beneath said ram to receive items of trash for compaction in said container by movement of the ram into said container, said container having *outwardly projecting* buttons on the exterior of opposite sides thereof;

a disposable trash receiving bag [fittable] *fitted* within said container and including an upper cuff portion of sufficient length and width [to be] reverse folded *over and* around the upper edge of said container,

and said bag having holes in said cuff portion [providing a

means of engagement] *engaging* over the buttons on said container [to hold] *and holding* the bag in position on said container against forces tending to draw said cuff



portion thereof into the container as trash is compacted within the bag and against the restraint of the container walls.

Re. 29,426

SAFETY STOPPING DEVICE FOR MARINE ENGINES

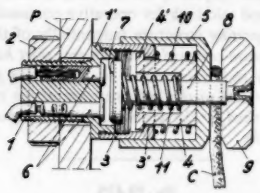
Alice Louise Rosalie Lariviere, widow Giroux, 55 rue de Turbigo, Paris, France

Original No. 3,726,264, dated Apr. 10, 1973, Ser. No. 127,526, Mar. 24, 1971. Application for reissue Dec. 2, 1975, Ser. No. 637,049

Claims priority, application France, Apr. 10, 1970, 70.13076

Int. Cl.[2] B60L *3/02*; F02P *11/06*

U.S. Cl. 123—148 S **7 Claims**



1. A safety device for marine engines comprising an insulating member attachable to a support, a pair of contact terminals mounted in said member and connectable to the engine ignition circuit, a push button slideably connected to said member, a conducting head positioned for connecting said terminals, a stem connected to said head and slideably extending through said push button, a retaining head on said stem positioned adjacent said push button, resilient means between said conducting head and said push button tending to retain said conducting head connecting said terminals, a cord attachably to the pilot of a boat containing said engine and detachably mountable between said push button and said retaining head for withdrawing said conducting head from said terminals whereby when said pilot pulls said cord it is withdrawn from said retaining head and push button allowing said conducting head to connect said terminals and means operable by said pushbutton for moving said conducting head to said terminals when said cord is mounted between said push button and said retaining head.

Re. 29,427

ELECTRORECORDING PAPER

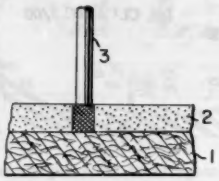
Yoichi Sekine, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Original No. 3,875,023, dated Apr. 1, 1975, Ser. No. 320,820, Jan. 3, 1973. Application for reissue Aug. 30, 1976, Ser. No. 718,989

Claims priority, application Japan, Apr. 5, 1972, 47-34762; May 31, 1972, 47-54666; Sept. 14, 1972, 47-92644

Int. Cl.[2] B41M *5/20*; G01D *15/34*

U.S. Cl. 204—2 **15 Claims**



1. An electrorecording paper having a color-developing layer containing a component capable of changing color in response to applied heat, said color-developing layer comprising a heat coloring component and an electroconductive substance, both of which are dispersed in the form of fine particles in a binder; said electroconductive substance being substantially light reflective, electron conductive and having a specific resistance not greater than 10^4 Ω cm and selected from the group consisting of cuprous iodide, tin dioxide[,] *and* silver-iodide[, and antimony]; and said color-developing layer having a [surfacee] *surface* resistivity of not greater than 10^7 Ω [cm.] at a temperature of 20° C. and at a relative humidity of 65%; said layer being capable of recording by changing color in response to heat applied by means of an applied electric current.

Re. 29,428

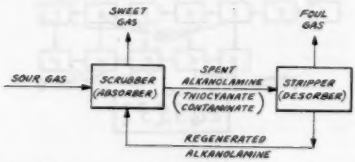
REGENERATION OF ALKANOLAMINE ABSORBING SOLUTION IN GAS SWEETENING PROCESSES

Otto A. Homberg, Easton; Charles W. Sheldrake, Bethlehem, and Alan H. Singleton, Baden, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Original No. 3,864,449, dated Feb. 4, 1975, Ser. No. 361,389, May 17, 1973. Application for reissue Nov. 10, 1975, Ser. No. 630,566

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—228 **20 Claims**



1. In combination with an aqueous alkanolamine absorption/desorption process wherein industrial gases are sweetened by removal of acid gases including hydrogen cyanide and sulfide gases, a process for preventing irreversible deterioration of the alkanolamine solution comprising:

maintaining sufficient ammonium ions in the alkanolamine solution during absorption to insure a continued presence of said ammonium ions in the alkanolamine solution during the absorption process, said ammonium acting as a deterrent with respect to the [formation] *accumulation*

of thiocyanates whereby irreversible deterioration of said alkanolamine solution by said thiocyanates is suppressed.

Re. 29,429

OSCILLATOR FOR A TIMEPIECE

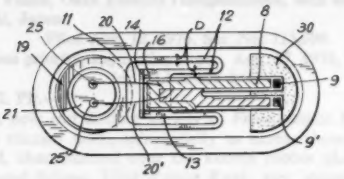
Masanori Kawai, Tatsuno; Haruo Takada, Suwa, and Shinkichi Kobayashi, Chino, all of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Original No. 3,909,639, dated Sept. 30, 1975, Ser. No. 460,231, Apr. 11, 1974. Application for reissue Oct. 20, 1976, Ser. No. 734,056

Claims priority, application Japan, June 14, 1973, 48-67132

Int. Cl.[2] H01L *41/04*

U.S. Cl. 310—348 **12 Claims**



11. A hermetically sealed quartz crystal tuning fork vibrator assembly particularly for use as a time standard in an oscillator circuit comprising in combination a flexural mode tuning fork quartz crystal vibrator having two substantially opposed planar surfaces and being adapted to vibrate in a first vibratory direction substantially parallel to said surfaces, and a mounting plate having a first portion including a substantially flat surface, the flat surface being secured to one of said opposed surfaces at a non-vibratory portion of said tuning fork vibrator, said mounting plate including a second portion mounted to a reference member, said mounting plate having a resilient portion intermediate said first and second portions, said resilient portion being formed of two substantially U-shaped spring-like elements, a first leg of each element being connected to said second portion and the other leg of each U-shaped spring-like element being adapted to vibrate in said first vibratory direction and to further vibrate in a second vibratory direction at an angle of about 90° with respect to said first vibratory direction.

Re. 29,430

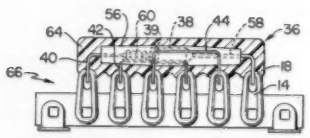
THERMAL LIMITER FOR ONE OR MORE ELECTRICAL CIRCUITS AND METHOD OF MAKING THE SAME

Emil Robert Plasko, Dayton, Ohio, assignor to Emerson Electric Co., St. Louis, Mo.

Original No. 3,649,942, dated Mar. 14, 1972, Ser. No. 101,848, Dec. 28, 1970. Continuation-in-part of Ser. No. 62,369, Aug. 10, 1970, abandoned. Application for reissue Apr. 4, 1975, Ser. No. 565,217

Int. Cl.[2] H01H *85/02*

U.S. Cl. 337—163 **9 Claims**



21. A thermal limiter for at least one electrical circuit comprising a thermally responsive fuse of generally cylindrical configuration; lead means operatively interconnected to said fuse for coupling said fuse in said circuit; an electrical circuit heater means disposed in a selected position adjacent said fuse in substantially parallel relation therewith and comprising a coiled heater wire having its opposed ends respectively electrically interconnected and securely attached to two lead means comprising blade-like leads positioned in line with the axis of said coil and wrapped at least partially around the ends thereof; a housing means receiving said heater means and said fuse therein in said selected position; and an insulating coating mass disposed in and cooperating with said housing to cover and secure said heater means and said fuse in said selected positioning with all of said lead means having at least portions thereof exposed from said mass; whereby said mass and said selected positioning provides a controlled delay in the time between activating of said heater means and the blowing of said fuse to open said one electrical circuit.

Re. 29,431

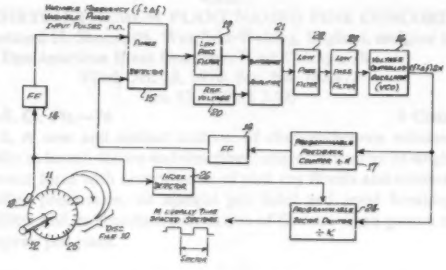
PHASE-LOCKED LOOP FOR AN ELECTRONIC SECTORING SCHEME FOR ROTATING MAGNETIC MEMORY

Ashok K. Desai, Chatsworth, Calif., assignor to Pertec Computer Corporation, Los Angeles, Calif.

Original No. 3,898,690, dated Aug. 5, 1975, Ser. No. 503,728, Sept. 6, 1974. Application for reissue July 12, 1976, Ser. No. 704,434

Int. Cl.[2] G11B *5/09*

U.S. Cl. 360—51 **2 Claims**



8. Apparatus for electronically dividing a rotating memory into a whole number of equally time spaced sectors comprising:

means mechanically connected to rotate in unison with said memory, said means being divided into a number of evenly spaced sectors by sector marks,

means for detecting said sector marks and generating a train of sector pulses at a frequency $f \pm \Delta f$, where Δf represents the magnitude of fluctuations in frequency of the sector pulses due to fluctuations in the speed of revolution of said memory,

a phase-locked loop having an oscillator controlled by a correction signal for producing an output signal at a frequency significantly greater than said train of sector pulses by a known factor, said correction signal being so produced as to stabilize the loop in phase by continual phase comparison of said sector pulses with feedback pulses, said feedback pulses being produced by continually dividing cycles of said oscillator output signal by said known factor, said correction signal being proportional to the difference between a reference DC signal and a phase error signal produced by second order filtering of a signal derived from phase comparison of said sector pulses with feedback pulses,

means for third and fourth order filtering of said correction signal, and

digital means for continually dividing said output signal by a predetermined integer to produce a timing signal having a number of cycles equal to said whole number of equally time spaced sectors.

PLANT PATENTS

GRANTED OCTOBER 4, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,117
RUBBER PLANT (*FICUS ELASTICA*)

Tokuyasu Ito, 56 Kamiari-cho, 6-chome, and Hideo Ikuta, 13-5, Aza Funae, Oaza Fushimi Okugaishinden, both of Hekinan, Aichi, Japan

Filed Aug. 12, 1976, Ser. No. 713,998
Claims priority, application Japan, Aug. 19, 1975, 50-99796
Int. Cl.[2] A01H *5/12*
U.S. Cl. Plt.—88 **1 Claim**

1. A new and distinct variety of *Ficus elastica* Roxb. var. *decora* tricolor hort., substantially as herein shown and described, characterized over the known rubber plant having variegated foliage, *Ficus elastica* Roxb. var. *decora* tricolor hort., in that proportions of light-yellow areas of the variegated leaves are small as a whole, said light-yellow areas appearing relatively narrow in size and are distinctly located on the edges of the leaves to form a so-called "thread-like border variegation"; leaves before development, namely buds and young leaves are reddish in color; grown leaves are larger in size than leaves of the known *Ficus elastica* Roxb. var. *decora* tricolor hort. and have an oblong shape with a thick coriaceous texture; and the new variety can be easily propagated by stem-cutting.

4,118
PISTACHIO TREE

Elmer C. Ruehle, 8599 Road 264, Terra Bella, Calif. 93270

Filed Sept. 24, 1976, Ser. No. 726,261
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—30 **1 Claim**

1. A new and distinct variety of pistachio tree of the *Pistachia vera* species substantially as illustrated and described which is generally similar in appearance to the Kerman pistachio tree and which produces fruit of uniformly large size characterized by having relatively thin shells with a higher percentage of natural shell splitting than the Kerman pistachio with the splitting occurring about the apex ends of the shells, which contain nut meat having a high meat to shell ratio by size and weight and characterized by a brilliant green exterior coloration extending in lighter shades throughout the meat and which ripen earlier than the Kerman, Red Allepo and Trabonella pistachios and at about the same time as the Bronte pistachio.

4,119
VINE — *CAMPSIS RADICANS*

William Flemer, III, Princeton, N.J., assignor to Treesearch

Filed Oct. 14, 1976, Ser. No. 732,492
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—54 **1 Claim**

1. A new and distinct variety of *Campsis radicans*, substantially as herein shown and described, characterized particularly as to novelty by the dark, rich red color of the flowers in contrast to the normal orange color of *Campsis radicans* flowers, and the glossy upper surface of the leaves in contrast to the normal dull upper surface of usual *Campsis radicans* leaves.

4,120
CHRYSANTHEMUM PLANT NAMED PINK CONCORD

Leonard H. Shoesmith, Westfield-Woking, England, assignor to Pan-American Plant Company, West Chicago, Ill.

Filed Oct. 15, 1976, Ser. No. 733,472
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of chrysanthemum substantially as herein shown and described, characterized by its single flower form with several rows of pink ray florets and minimal pollen production, its upright pot habit and good breaking ability, and its abundant production of flowers when grown as a spray pot plant.

4,121
APPLE TREE—ROYAL GALA VARIETY

Hendrik Willem Ten Hove, Matamata, New Zealand, assignor to Stark Brothers Nurseries & Orchards Company, Louisiana, Mo.

Filed July 28, 1976, Ser. No. 709,506
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct variety of apple tree which is a mutation of the Gala variety (U.S. Plant Pat. No. 3,637) substantially as shown and described, characterized by an all over bright red color overlaid with obscure darker broad striping.

PATENTS

GRANTED OCTOBER 4, 1977

ERRATA

For CLASS	See PATENT NO.
363–043	4,052,657
363–043	4,052,658
363–057	4,052,659
364–200	4,052,702
364–200	4,052,703
364–900	4,052,704
346–107 R	4,052,712
346–140 A	4,052,713
346–155	4,052,714
346–160	4,052,715
361–103	4,052,744
560–121	4,052,434
560–128	4,052,435
560–052	4,052,436
560–025	4,052,437
560–061	4,052,438
560–129	4,052,439
560–154	4,052,440
560–179	4,052,441
560–243	4,052,442
364–113	4,052,598
364–469	4,052,599
364–554	4,052,600
364–104	4,052,601
364–424	4,052,602
364–120	4,052,603
364–786	4,052,604
364–724	4,052,605
364–825	4,052,606
362–018	4,052,607
362–368	4,052,608
362–071	4,052,609
362–200	4,052,610
318–561	4,052,642
251–004	4,051,578
407–107	4,051,584
364–465	4,051,998
366–341	4,052,037
366–90	4,052,038
431–077	4,052,136
425–392	4,052,145
425–463	4,052,146
051–081 BS	4,052,174
051–096	4,052,175
062–188	4,052,180
134–056 R	4,052,227

204–181	4,052,309
544–022	4,052,387
544–054	4,052,388
544–089	4,052,389
544–118	4,052,390
544–117	4,052,391
544–211	4,052,392
424–250	4,052,395
548–341	4,052,409
548–305	4,052,410
548–342	4,052,411

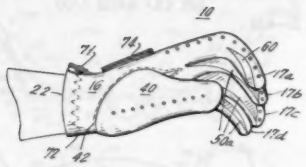
PATENTS

GRANTED OCTOBER 4, 1977

NOTE—A cross reference listing of applications published under Trial Voluntary Protest Program on January 28, 1975 is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,051,552
GOLF GLOVE
John D. Widdemer, Gloversville, N.Y., assignor to Berkshire Leather Corporation, Gloversville, N.Y.
Filed July 16, 1975, Ser. No. 596,292
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—161 A **8 Claims**



1. A golf glove comprising:

a rear portion having a wrist edge and having a plurality of rear portion finger portions extending from the edge opposite said rear portion wrist edge to a respective tip; said rear portion finger portions including, in sequence, an index finger portion, a middle finger portion, a ring finger portion and a little finger portion; each said rear portion finger portion being joined at the base thereof to the adjacent said rear portion finger portion at a junction;

a palm portion having a wrist edge and a thumb opening spaced from said palm portion wrist edge and being defined by a periphery; said palm portion having a corresponding plurality of finger portions extending from the edge opposite said palm portion wrist edge to a respective tip; said palm portion finger portions including, in sequence away from said thumb opening, and index finger portion, a middle finger portion, a ring finger portion and a little finger portion; each said rear portion palm portion being joined at the base thereof to the adjacent said rear portion palm portion at a junction each said rear portion finger portion and the respective said palm portion finger portion being so positioned on their respective said rear and palm portions as to generally be overlaid;

each of said plurality of palm portion finger portions having a proportionally shorter length from its said tip to its said junction than the length of the corresponding one of said plurality of rear portion finger portions;

a thumb enclosing portion fastened along said periphery of said thumb opening and shaped to form a generally straight enclosure for the thumb of the wearer;

a plurality of fourchettes each extending from a said tip of a said finger portion to a said junction; each said fourchette having first and second curved opposite contoured edges which are both curved generally in the same direction; each said fourchette being fastened along one of its said first and second curved edges to one edge of a said palm portion finger portion and being fastened along the opposite said curved edge to the opposed edge of the corresponding said rear portion finger portion each said fourchette extending from the said tip of its said finger portions to said junctions thereof; each aid forchette being prestretched along said contoured edge fastened to its corresponding rear finger portion to reduce the amount of stretch along the length of each finger as the hand is folded to its position fully gripping a golf club handle;

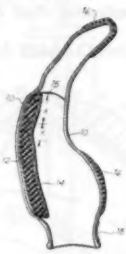
a first curved end piece having a pair of opposite contoured edges; one of said first end piece opposite edges being fastened to the said palm portion index finger portion nearest to said thumb enclosure and the other of said first end piece opposite edges being fastened to the corresponding edge of said rear portion index finger portion;

a second curved end piece having a pair of opposite contoured edges, one of said second end piece opposite edges being fastened to the said palm portion little finger portion furthest from said thumb enclosure and the other of said second end piece opposite edges being fastened to the corresponding edge of said rear portion little finger portion;

said palm and rear portions being fastened to each other along a remaining glove edge, said palm and rear portion wrist edges remaining unfastened;

each said fourchette and said first and second end pieces having their said curved edges predeterminately established and shaped to curl said finger portions upwardly above said palm portion and inwardly along an arc extendable generally towards said palm portion wrist edge and to generally conform said finger portions to the shapes of the wearer's fingers, thereby to avoid bunching of the glove fabric on the fingers and around the finger joints.

4,051,553
HAND PROTECTOR
Arthur R. Howard, 4705-29th St., Lubbock, Tex. 79410
Filed Dec. 14, 1976, Ser. No. 750,381
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—161 A **11 Claims**



1. The hand protective device comprising:

a. a glove,

b. a pad of resilient material attached to the back of said glove,

c. said pad extends over the metacarpo-phalangeal joints of a hand inserted into said glove,

d. said pad is molded such that it curves downward against the fingers at a point distal of the metacarpo-phalangeal joints of a hand inserted into said glove,

e. said molded pad providing means for exerting a force on the top of the fingers of a hand inserted into said glove,

f. said glove is made of cotton net,

g. said resilient material comprises hard foam rubber,

h. said pad is covered by cotton net,

j. friction material is affixed to the palm surfaces of the length of the thumb and index finger, the palm, and the tips of the remaining fingers,

k. said friction material is latex rubber compound,

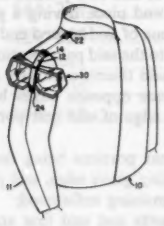
m. said glove is secured by a VELCRO tape fastener affixed to the wrist of the glove.

4,051,554

ACCESSORY HOLDER FOR USE ON ARTICLE OF CLOTHING

Robert A. Kallman, 2030 Haring St., Brooklyn, N.Y. 11229

Filed May 26, 1976, Ser. No. 690,262
Int. Cl.² A41D 1/00
U.S. Cl. 2—94 **7 Claims**



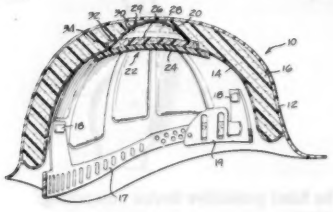
1. An accessory holder for an article of clothing for the upper body portion of the type including a shoulder and an arm portion comprising a flap member, one end of said flap member adpated to be fixedly secured at a point on said article, and cooperating means on said flap and for said article for selectively attaching the other end of said flap to one of two points on said article, the first of said two points being a storage position for the flap on the shoulder of the article and the second of said points being on the arm of said article with the accessory to be held by the said other end of the flap passing around the accessory and being attached to the second point.

4,051,555

PROTECTIVE HEADWEAR

Noel Daly, New Plymouth, New Zealand, assignor to E. D. Bullard Company, Sausalito, Calif.

Filed Dec. 10, 1976, Ser. No. 749,247
Claims priority, application New Zealand, Dec. 19, 1975, 179613
Int. Cl.² A42B 3/02
U.S. Cl. 2—412 **15 Claims**



1. In protective headwear adapted to surround at least a substantial cranial portion of the head of the wearer and comprising a shock absorbing shell including a thin wall outer shell of tough non-brittle material, a thin wall inner shell of tough non-brittle material fitted within said outer shell and spaced therefrom and a relatively thick walled shell of shock absorbing padding filling the space between said inner and outer thin wall shells, the improvement comprising:

a recess at the inner apex of said thin wall inner shell extending substantially through the thickness of said thick wall shell of shock absorbing padding, said recess having an area which is a substantial portion only of the average area of the crown of the human skull; and

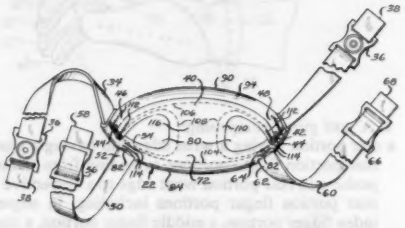
an insert member comprising a generally planar member made of comfort padding and a generally planar member made of shock absorbing padding each having one major surface adhered to one major surface of the other, said member of comfort padding having major surfaces of larger area than said recess, said member of shock absorbing padding having major surfaces of smaller area than said area of said major surfaces of said member of comfort padding and centered on said one major surface thereof, and said member of shock absorbing padding being received within said recess with the exposed edges of said one major surface of said member of comfort padding on contact with the interior of said thin wall inner shell and the other major surface thereof exposed to contact by the head of the wearer.

4,051,556

CHIN STRAP FOR PROTECTIVE HEADGEAR

Stanley Davenport, Knoxville, Tenn., and Frank K. Villari, Oak Park, Ill., assignors to The Kendall Company, Boston, Mass.

Filed Oct. 20, 1976, Ser. No. 734,209
Int. Cl.² A42B 7/00
U.S. Cl. 2—421 **8 Claims**



1. A chin strap for protective headgear, comprising:

an elongated first strap having means for attaching opposed end portions of the first strap to the headgear;

a second strap having opposed ends connected to the first strap at spaced first and second points in a central portion of the first strap, said first and second straps being spaced from each other intermediate the connecting points;

a third strap having one end connected to the first strap at a third point intermediate said first and second connecting points and adjacent said first connecting point, and having means for attaching the other end portion of the third strap to headgear;

a fourth strap having one end connected to the first strap at a fourth point intermediate said first and second connecting points and adjacent said second connecting point, and having means for connecting the other end portion of the fourth strap to the headgear; and

a chin cup extending between the spaced portions of said first and second straps.

4,051,557

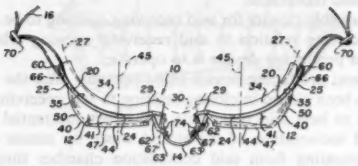
EYE PROTECTORS

Torsten R. Bengtson, and Joseph Haslbeck, both of West Vancouver, Canada, assignors to International Servisport Corporation Ltd., Vancouver, Calif.

Filed Aug. 1, 1975, Ser. No. 600,976
Claims priority, application Canada, June 5, 1975, 228781
Int. Cl.² A61F 9/02
U.S. Cl. 2—430 **9 Claims**

1. An eye protector for use in swimming and adapted to provide the minimum reduction in vision of the wearer, to be a close fit around the eye of the wearer and to permit streamline flow over the exterior surface of the protector, the protector comprising a pair of separate eye pieces interconnected at inner ends by a nose piece, each eye piece comprising an integrally formed body of a transparent material, said body comprising a stiff, curved, relatively wide rim dimensioned to fit around an eye socket of the wearer, under the brow and on top of the check bone and transversely curved to fit over the temple of a wearer and against the side of the nose of the wearer; an ovaloid opening defined at the inner periphery of

the rim; a generally dome shaped hood, extending outwardly from the inner periphery of the rim and enclosing the eye opening in the rim for permitting straight ahead and peripheral vision therethrough, said hood including at least first and second portions, said first portion comprising a lens portion having a relatively large radius of curvature and being located substantially directly in line with the line of sight of the wearer and said second portion comprising a bulbous dome shaped wall portion which surrounds said lens portion and extends to the inner periphery of said rim, the curvature of the wall portion being substantially greater than that of said lens portion and following generally that of the eyeball of a wearer, said hood further comprising a third portion located between said



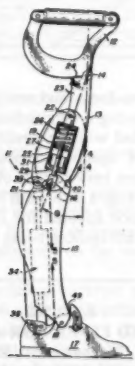
first and second portions, at least part of said first portion being spaced from said second portion and said third portion comprising a transition between said first and second portions, a sealing pad formed on the inner side of the rim dimensioned to contact the face of the wearer under the brow, on top of the checkbone, over the temple and against the side of the nose of the wearer so as to provide an underwater seal around the eye, said pad being soft enough to conform to a wearer's face around the eye socket to seal each eye piece; a connector means on the outer end of the frame and a flexible strap secured to said connector means to extend around the back of the wearer's head to hold the eye piece in position over the eye sockets.

4,051,558

MECHANICAL ENERGY STORAGE DEVICE FOR HIP DISARTICULATION

Wilbur C. Vallotton, Los Gatos, Calif., assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed June 30, 1976, Ser. No. 701,448
Int. Cl.² A61F *1/00, 1/08*
U.S. Cl. 3—1.2 **8 Claims**



1. In an artificial leg:

trunk socket means for receiving and for coupling the trunk of the person using the artificial leg to the artificial leg;

thigh means hingedly coupled to said trunk socket means and dependent therefrom for simulating a thigh section of a human leg;

leg means hingedly coupled to said thigh means and dependent therefrom for simulating a leg section of a human leg;

a foot means hingedly coupled to said leg means and dependent therefrom for contacting the walking surface; and

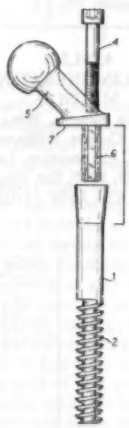
energy storage means operatively associated with said thigh means for storage and release of energy during the normal walking stride cycle of the patient for storage of energy during a weight-bearing phase of the normal walking strike when the user's weight is on the artificial leg and for release of energy during an energy release phase of the normal walking cycle when the user's weight is removed from the artificial leg to pivot said thigh means forwardly about the hinged coupling of said thigh means to said trunk socket means.

4,051,559

TOTAL PROSTHESIS OF THE HIP

Marc Laurent Pifferi, Boissy Saint Leger, France, assignor to Mahay & Cie, France

Continuation-in-part of Ser. No. 643,406, Dec. 22, 1975, abandoned. This application Sept. 1, 1976, Ser. No. 719,391
Claims priority, application France, Dec. 27, 1974, 74.42974
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.912 **8 Claims**



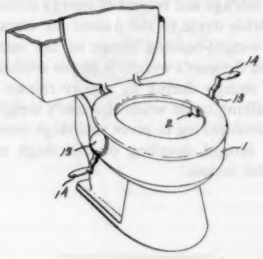
1. In a total prosthesis of the hip, comprising a cotyloid portion adapted to be inserted in the hip bone and a cephalic portion adapted to be inserted in the femur, the cephalic portion fitting into the cotyloid portion, the improvement in which said cephalic portion comprises a femoral part having a cylindrical externally helically threaded shank portion adapted to be screwed into the medullar canal of the femur and a cephalic part having a base member the underside of which having a flat diaphyseal resting and abutment surface adapted to abut against a bone surface prepared in corresponding manner, an arm on said base member terminating in a ball means for insertion into said cotyloid portion and a sleeve depending perpendicularly from and eccentric with respect to the diaphyseal resting surface, said sleeve fitting in a bore of the same cross section provided in said femoral part, and means for securing said femoral part to said cephalic part.

4,051,560

BOWEL MOVEMENT ENERGIZER SYSTEM

Francois Audet, 5010 Fossambault Boulevard, St. Catherine, Portneuf, Canada

Filed Oct. 4, 1976, Ser. No. 728,935
Int. Cl.[2] A47K *17/00*
U.S. Cl. 4—1 **12 Claims**



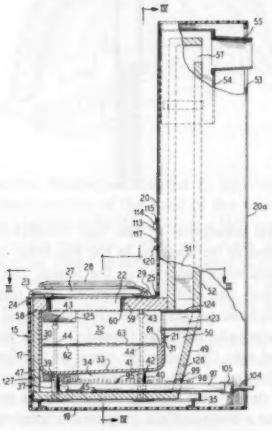
1. A bowel movement energiser system adapted for operation by a person sitting on a toilet bowl, this energiser system comprising a pair of exerciser units operatively securable to the opposite sides respectively of the toilet bowl in transverse alignment with the trunk of the person sitting on the toilet bowl, each exerciser unit including a bracket fixedly securable to the upper edge of the toilet bowl and having a base portion outwardly positioned with respect to the toilet bowl, a cyclic movement mechanism mounted on said base portion, and a handle operatively connected to said cyclic movement mechanism and operatively displaceable up and down laterally outward of said toilet bowl for actuation of the corresponding cyclic movement mechanism.

4,051,561

STORE AND BURN INCINERATING TOILET AND METHOD

Donald P. Frankel, Lake Geneva, Wis.; Willard E. Kendall, Elgin, Ill., and John F. Cooper, Williams Bay, Wis., assignors to Lake Geneva A & C Corporation, Lake Geneva, Wis.

Filed Oct. 31, 1975, Ser. No. 627,756
Int. Cl.[2] A47K *11/02*
U.S. Cl. 4—131 **32 Claims**



1. A store and burn incinerating toilet, comprising:

a housing;

a heat permeable upwardly opening receptacle of substantial capacity within the housing;

said receptacle being of a size adapting it to receive and accumulate and store waste from a plurality of successive uses of the toilet;

means within the housing defining a combustion chamber in heat transfer relation under said receptacle;

a deck on said housing having a receiving opening over the top of said receptacle and aligned with the upward opening into the receptacle and through which receiving opening waste is adapted to be deposited in said receptacle;

said deck providing a toilet seat support;

a selectively operable heat producing device disposed in said combustion chamber under said receptacle and adapted to heat said receptacle in substantially the manner of heating a cooking pot, but being inoperative while said receiving opening is open to receive waste therethrough for deposit in said receptacle;

a removable closure for said receiving opening to be applied in closing relation to said receiving opening when said heat producing device is to operate;

said heat producing device being operable after the closure has been placed in closing relation to said receiving opening to heat said receptacle and effect substantial boiling and incineration of the stored waste by means of heat permeating from said combustion chamber through at least the bottom of the receptacle from the combustion chamber;

means providing an air passage in preheating relation to said combustion chamber and leading into said receptacle;

an afterburner flue leading from the combustion chamber; and

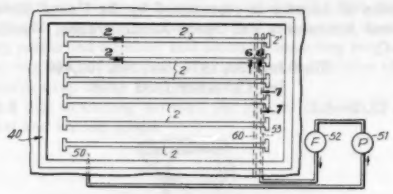
means compelling vapor and products of combustion generated in said receptacle to pass into said combustion chamber and to travel toward the flue and thereby causing the vapor and products of combustion to pass through the heat produced by the heat producing device in the combustion chamber.

4,051,562

TILE CONSTRUCTION FOR A SWIMMING POOL

Henry Jakowicki, 123 Malts Ave., West Islip, N.Y. 11795

Filed Oct. 20, 1976, Ser. No. 734,328
Int. Cl.[2] E04H *3/16, 3/18;* **F16L** *22/02*
U.S. Cl. 4—172 **27 Claims**



1. Tile construction for a swimming pool comprising an elongated member having a longitudinal channel therein, said member being provided with a plurality of orifices extending into said channel and opening externally of the member to provide communication between the channel and the exterior of the member to provide a flow path for a fluid, said member having an outer surface adapted for constituting part of the surface of the pool, said orifices being open in the vicinity of said outer surface.

4,051,563

CUSHIONED LINER FOR A BATH TUB

Joseph A. Clarke, Jr., 75 Loomis St., Bedford, Mass. 01730

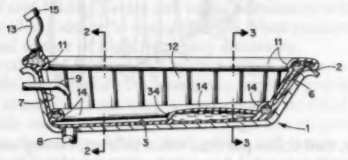
Filed May 16, 1975, Ser. No. 577,987
Int. Cl.[2] A47K *3/00, 3/12*
U.S. Cl. 4—173 R **13 Claims**

1. In a cushioning water filled liner for a bath tub that includes a back cushioning portion provided by back flexible

water filled cushions conforming to the back of the bath tub and left and right side cushioning portions provided by left and right side flexible water filled cushions conforming to the left and right sides of the bath tub, means interconnecting said cushions comprising,

an elongated top water filled cushion that conforms to the top rim of the bath tub and connects to the back and left and right side water filled cushions,

water passages between the top cushion and the top most end of the back and left and right side water filled cushions,



a water conducting tube connected at one end to the top cushion and adapted at the other end for connections to the bath tub water spigot by which to fill said cushions with water,

the elongated top cushion and the back, left and the right side cushions are fixedly connected together defining an open ended elongated liner and

connecting means are provided at the ends of said elongated liner for connecting and disconnecting said ends together so that the liner defines a closed ring fitting the bath tub when said ends are connected and

means by which to empty said cushions of water.

4,051,564

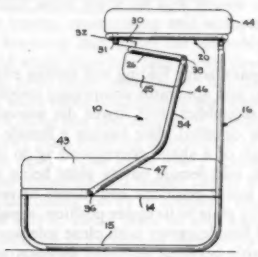
PORTABLE CONVERTIBLE SOFA-BUNK BEDS

Anthony Gudish, 2822 Dalemead St., Torrance, Calif. 90505

Filed Oct. 26, 1976, Ser. No. 735,585

Int. Cl.[2] A47C *17/16*

U.S. Cl. 5—9 R **15 Claims**



1. A portable sofa adapted to be converted into a lower and upper tiered bed, which comprises:

a seat structure having a front, rear and opposite end portions adapted to be made into a lower bed,

an upright structure having an upper and lower side, the lower side being mounted on the rear portion of the seat structure,

a first forwardly inclining backrest structure disposed in backrest position on said seat structure and having a lower side and an upper side pivotably connected to the upper side of the upright structure,

first hinge means adapted to rotate the first backrest structure about the upper side of said upright structure,

a second forwardly inclining backrest structure having a lower side, an upper side and opposite ends disposed behind and along side of said first backrest structure, the lower side being pivotably connected to the lower side of said first backrest structure,

second hinge means adapted to rotate the second backrest structure about the lower side of said first backrest structure,

a pair of spaced apart elongate arms having a lower pivotal connection to the opposite ends of said seat structure at approximately two-thirds of the distance from the rear to the front portion of said seat structure and an upper pivotal connection to the opposite ends adjacent the upper side of said second backrest structure, and

linkage means, in combination with the elongate arms and said first and second backrest structures, adapted to raise and support said structures to an upper side to side, coplanar bed position.

4,051,565

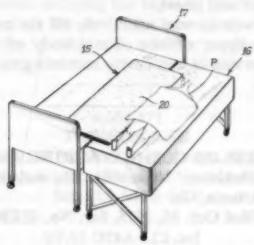
MAT CONVEYOR

Trygve Berge, 2 Adams, Apt. 1109, Denver, Colo. 80206

Filed July 26, 1976, Ser. No. 708,605

Int. Cl.[2] A47B *83/04*; A47C *23/00*

U.S. Cl. 5—81 B **1 Claim**



1. A lightweight, portable conveyor for moving objects over an undersupporting surface, consisting of an open ended, flexible walled, radially collapsible, seamless tubular member dimensioned to at least coextend with the underside dimensions of an object to be moved, said member being made up of two concentrically laminated cylindrical layers of dissimilar flexible materials; the outer one of said layers being relatively thick spongy material selected from the group of foam rubber and expanded foam plastic and having an exterior surface of relatively high frictional quality for frictionally coupling the tubular member to the underside of said object and an undersupporting surface; and the inner one of said layers being relatively thin plastic material having the general anti-friction characteristics of polytetrafluoroethylene resin whereby opposed surface portions of said inner layer are interengaged in the radially collapsed state of said member and are slidingly movable over one another with little frictional resistance under the weight of the object to facilitate moving the latter in directions transversely of said member's tubular axis.

4,051,566

MATTRESS WITH MODIFIABLE CAVITY FOR PREGNANT WOMEN

Lucy C. Esquivel, 509 E. Pershing, Gallup, N. Mex. 87301

Filed Sept. 20, 1976, Ser. No. 724,931

Int. Cl.[2] A61G *7/04*

U.S. Cl. 5—91 **4 Claims**

1. A mattress structure useable by pregnant women comprising:

a resilient body comprising a mattress having upper and lower surfaces and a cavity extending downwardly from said upper surface and through said lower surface to accommodate the expanding abdomen of a woman in full term pregnancy,

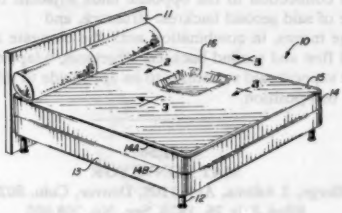
an insert for said cavity comprising a part of said mattress

and substantially the same shape as said cavity but slightly smaller for movement longitudinally in said cavity,

a cover for the top of said mattress,

the walls of said cavity and the top of said insert forming a support for the abdomen of a pregnant woman resting on the upper surface of said body, and

means mounted on the structure for selectively moving said insert longitudinally of said cavity and maintaining it in a given location,



said cover adjacent said insert deforming to follow it upon movement in said cavity and outlining said cavity at any position of said insert,

whereby a woman may selectively fill the cavity to form a complete upper surface of said body or enlarge or decrease the size of said cavity according to the size of her abdomen.

4,051,567

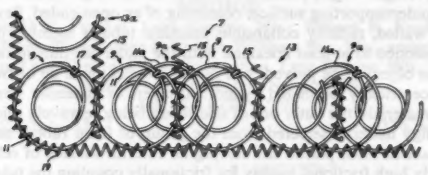
MATTRESS OR CUSHION SPRING ASSEMBLY

Ronald G. Hutchinson, Naperville, Ill., assignor to Simmons Company, Atlanta, Ga.

Filed Oct. 16, 1975, Ser. No. 622,886

Int. Cl.[2] A47C *23/04*

U.S. Cl. 5—260 **5 Claims**



1. A spring assembly for a mattress or cushion or the like having at least a peripheral row of vertical open-coil helical wire springs and top and bottom border wires to which said springs are connected, said springs in at least selected zones of only said peripheral row along each side of said assembly being interleaved with their top and bottom convolutions in overlapping engagement to reinforce the side edges of the assembly.

4,051,568

LIFE SAVING GARMENT

Willem Josef George Stroienberg, 11, Bartholomew Lane, Sudbury, Suffolk, England

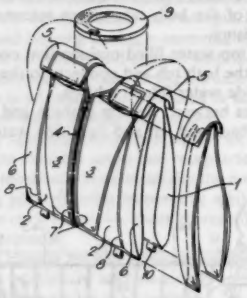
Filed July 21, 1976, Ser. No. 707,406

Claims priority, application United Kingdom, July 23, 1975, 30802/75

Int. Cl.[2] B63C *9/12*

U.S. Cl. 9—340 **9 Claims**

1. A life saving garment comprising a double skinned, totally sealed flexible liner and a buoyant neck ring, said liner enclosing a predetermined quantity of air and having at least a back portion, a front portion and a collar portion, the quantity of air in the liner mainly occupying the back portion during normal working conditions to enable freedom of movement, said liner and said quantity of air being such that the air is forced into the upper part of said back and front portions and into said collar portion when the wearer is substantially submerged in the



water, said collar portion, when inflated, raising said neck ring for maintaining the wearer's head above the water.

4,051,569

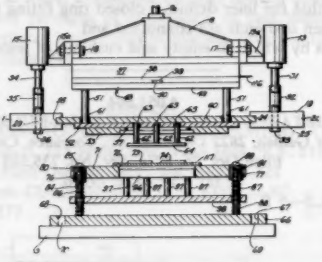
FOLDING AND SEALING APPARATUS AND METHOD

David Bruce Freeman, Cincinnati; Michael C. Patton, Fairfield, and Carl F. Dragan, Harrison, all of Ohio, assignors to Louis G. Freeman Company, Cincinnati, Ohio

Filed Oct. 22, 1976, Ser. No. 735,009

Int. Cl.[2] A43D *11/00*; C14B *00/00*; B65H *45/22*

U.S. Cl. 12—146 CK **30 Claims**



1. An apparatus for folding and sealing edges of a non-rigid work piece, said apparatus comprising cooperating lower and upper die assemblies, said lower die assembly comprising a horizontally oriented plate having a female cavity extending therethrough of a shape corresponding to that of the folded work piece, said female cavity plate being shiftable between upper and lower positions and means to resiliently bias said female cavity plate to its upper position, a male plug receivable within said female cavity with close tolerance, said male plug being shiftable between an upper position within said female cavity with its upper surface slightly below the upper surface of said female cavity plate when said female cavity plate is in its upper position and a lower position wherein said male plug is withdrawn from said female cavity when said female cavity plate is in its upper position and wherein the top surface of said plug is substantially coplanar with said top surface of said female cavity plate when said female cavity plate is in its lower position, means to bias said male plug to its upper position, said upper die assembly comprising a horizontally oriented folding cavity plate, said folding cavity plate having a shallow folding cavity therein corresponding in shape to said female cavity, said folding cavity having curved edge portions corresponding to the edges of the work piece to be folded, said folding cavity plate having at least one electrode mounted therein so as to overlie the edges of the work piece when folded, said folding cavity plate having a central depression, a stripper comprising a horizontal plate independently shiftable between an extended

position below said folding cavity and a retracted position within said central depression of said folding cavity and means to connect said electrode to a source of high frequency electricity whereby when a work piece is properly aligned on said female cavity plate and said stripper is in its extended position, the folding cavity plate and the stripper may be lowered until said stripper forces said work piece into said female cavity and said male plug to its lower position initiating folding of said work piece edges, continued downward movement of said folding cavity plate shifts said female cavity plate to its lower position resulting in relative upward movement of said male plug and said stripper to cause said partially folded work piece edges to be completely folded by said inwardly curved edge portions of said folding cavity and to lie in abutment with said at least one electrode, to be sealed thereby when connection is made to said source of high frequency electricity.

15. A process of folding and sealing edges of a non-rigid, heat sealable work piece comprising the steps of providing a lower die assembly comprising a horizontally oriented plate with a female cavity extending therethrough of a shape corresponding to that of the folded work piece, said female cavity plate being shiftable between upper and lower positions and resiliently biased to said upper position and a male plug receivable within said female cavity with close tolerance, said male plug being shiftable between an upper position with the female cavity with its upper surface slightly below the upper surface of said female cavity plate when said female cavity plate is in its upper position and a lower position wherein said male plug is withdrawn from said female cavity when said female cavity plate is in its upper position and wherein the top surface of said plug is substantially coplanar with said top surface of said female cavity plate when said female cavity plate is in its lower position, means to bias said male plug to its upper position, providing an upper die assembly comprising a horizontally oriented folding cavity plate, said folding cavity plate having a shallow folding cavity therein corresponding in shape to said female cavity, said folding cavity having curved edge portions corresponding to the edges of the work piece to be folded, said folding cavity plate having at least one electrode mounted therein so as to overlie the edges of the work piece when folded, said folding cavity plate having a central depression, a stripper comprising a horizontal plate independently shiftable between an extended position below said folding cavity, and a retracted position within said central depression of said folding cavity, locating said work piece on said female cavity plate over said female cavity, maintaining said stripper in its extended position, lowering said upper die assembly until said stripper forces said work piece into said female cavity depressing said male plug to its lower position and initiating a fold in said edges of said work piece, maintaining the positions of said stripper, said work piece and said male plug, continuing lower of said folding cavity plate resulting in abutment of and lowering of said female cavity plate to its lower position wherein said male plug has reentered said female cavity shoving said work piece into said folding cavity to complete folding of said work piece edges and to cause them to abut said electrode, connecting said electrode to a source of high frequency electrical current to seal said folded edges, permitting said sealed edges to cool until a seal is assured and raising said upper die assembly to shift said folding cavity plate and said stripper out of contact with said lower die assembly and said work piece.

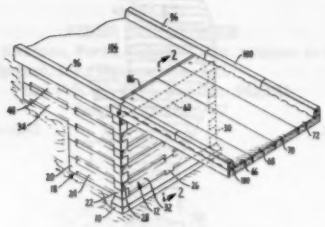
4,051,570

ROAD BRIDGE CONSTRUCTION WITH PRECAST CONCRETE MODULES

William K. Hilfiker, Eureka, Calif., assignor to Hilfiker Pipe Co., Eureka, Calif.

Filed Dec. 27, 1976, Ser. No. 754,496
Int. Cl.[2] E01D *19/02*
U.S. Cl. 14—26 **11 Claims**

1. A road bridge including an abutment therefor formed of readily transportable precast construction modules, said bridge comprising: a footing placed below road grade; generally vertical extending tie rods connected to said footing and extending upwardly therefrom, at least one of said rods being positioned adjacent each end of said footing; at least one abutment stretcher positioned above and parallel to said footing, said stretcher having an elongated retaining body interconnecting support heads at either end of the stretcher, said heads having top and bottom stacking surfaces and each having a vertical hole therethrough, said holes being so spaced from one



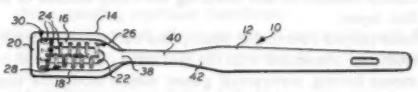
another that said holes will receive said vertical tie rods; an abutment beam overlying the topmost of said abutment stretchers, said beam having holes spaced to receive said vertical tie rods; means securing the beam to the tie rods to stress the rod and capture the stretchers beneath the beam between the beam and the footing; and, a bridge roadbed placed with one end overlying and supported by said abutment beam.

4,051,571

TOOTHBRUSH

Herbert D. Ayers, 38 Mineola Ave., Roslyn, N.Y. 11576

Filed June 1, 1976, Ser. No. 691,471
Int. Cl.[2] A46B *9/04*
U.S. Cl. 15—167 R **5 Claims**

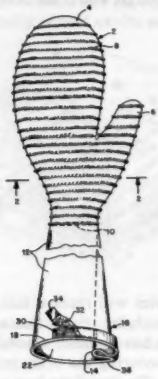


1. A toothbrush comprising an elongated handle, a base member connected to said handle, and a plurality of tufts of bristles connected to and extending outwardly from said base member, said tufts being formed in three distinct rows of adjacent tufts, a first row of tufts spaced along said base member substantially parallel to the longitudinal axis of said toothbrush, the tufts in said first row extending angularly from said base member, a second row of tufts spaced along said base member substantially parallel to said first row of tufts and extending angularly from said base member and toward said first row, the tufts of said first row intersecting opposite tufts in said second row in a single plane along the central portion of said toothbrush thereby to form a single, substantially linear continuous row of bristles, the bristles of said first row being at least partially intermeshed with the bristles of said second row at substantially the outermost portion thereof, and a third row of spaced tufts positioned near the end of said base member farthest from said handle, said tufts being aligned substantially perpendicularly to said first and second rows and extending angularly toward the tufts of said first and second row, said third row having central tufts at least partially contacting the tufts of said first and second row and peripheral tufts extending parallel to said central tufts but not contacting said tufts of said first and second row, the tips of the bristles in said third row and the plane of intersection of said first and second rows forming a T-shaped pattern when viewed from above said toothbrush, said first, second and third rows of tufts being the only rows of tufts on said toothbrush effective to cleanse when contacting teeth.

4,051,572
SCOURING MITTEN

Helen Greenwood, 64 Fanning Ave., Hampton Bays, N.Y. 11946

Filed Aug. 19, 1976, Ser. No. 715,878
Int. Cl.[2] A47K 7/02
U.S. Cl. 15—227 5 Claims



1. A waterproof stretchable scouring mitten comprising:

hand covering means having a first pouch for enveloping a thumb and a second pouch for enveloping the remainder of the hand having a generally planar configuration and extending along an axis and a wrist opening to provide means for insertion and removal of a hand, said first pouch opening into and extending radially from said axis in substantial planar alignment with said axis, said hand covering means being composed of a waterproof stretchable first layer and a second layer of scouring material intimately bonded to and covering the outer surface of said first layer;

tubular shaped stretchable waterproof cuff means extending from and connected with the said wrist opening, said cuff means having waterproof gusset means along the linear axis of the cuff means located normal to the plane of the said first pouch means to facilitate ingress and egress of a hand into the mitten through the cuff;

closure means affixed to said gusset means to bring at least a circumferential portion of said cuff means to a snug fitting relationship with a portion of the forearm of a wearer of the mitten;

and, liquid flow diversion means circumferentially mounted on said cuff means to direct the flow of liquids towards said hand covering means.

4,051,573
POULTRY LEG RETAINER

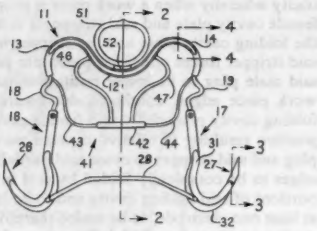
Anthony J. Volk, 173 E. Syracuse St., Turlock, Calif. 95380

Continuation-in-part of Ser. No. 476,297, June 4, 1974, Pat. No. 3,895,415. This application Apr. 14, 1975, Ser. No. 567,761
Int. Cl.[2] A22C 21/00
U.S. Cl. 17—11 6 Claims

1. A poultry leg retainer comprising a crosspiece having a downwardly bowed center,

a pair of legs depending one from each end of said crosspiece and each having a substantially rigid hook portion extending laterally outward and upwardly from the bottom of the leg,

a central resiliently extensible bar extending between said legs below said crosspiece for engaging the underside of poultry hocks, and

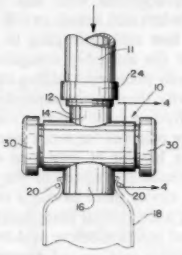


a pair of resiliently extensible straps extending between said crosspiece and said central bar in position for fitting in the knuckle creases of poultry hocks.

4,051,574
SAUSAGE STUFFING DEVICE

Tobias A. Gaspar, South Dartmouth, Mass., assignor to Gaspar's Linguica Company, Inc., South Dartmouth, Mass.

Filed Oct. 26, 1976, Ser. No. 735,805
Int. Cl.[2] A22C 11/02
U.S. Cl. 17—35 9 Claims



1. A device for removing hard particles from sausage mix and the like comprising, a longitudinally orientated first tubular conduit forming a flow passage for said sausage mix under pressure therethrough, a laterally orientated second tubular conduit intersecting and disposed generally normal to said first conduit so that at least portions of said second conduit are laterally offset from said flow passage, a member positiond within said second conduit and extending entirely across said flow passage, said member including a plurality of continuous slotted openings having a cross-sectional configuration narrowing in the flow direction of said mix disposed therethrough, at least portions of said openings extending at least partially across and generally normal to said flow passage and extending laterally outwardly of said flow passage at least partially into said offset portions of said second conduit and means operatively associated with said second conduit to gain access to said member for removal therefrom.

4,051,575
PROCESS OF PRODUCING SLIVERS FOR OPEN-END SPINNING

William Frank Hutcheson, Lookout Mountain, Tenn., assignor to Rossville Yarn Processing Company, Rossville, Ga.

Filed May 26, 1976, Ser. No. 690,297
Int. Cl.[2] D01G 15/46
U.S. Cl. 19—151 4 Claims

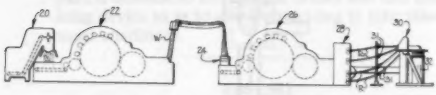
1. A process of producing slivers of textile fibers for spinning yarns with open-end spinning machines and being characterized by uniform fiber distribution and weight along the length

of the sliver without the necessity of repeated doublings and draftings heretofore required to produce such slivers, said process comprising the steps of:

forming a first carded web by carding textile fibrous material in a textile card;

cross-lapping the first carded web to reorient and improve the fiber distribution;

forming a second carded web by carding the cross-lapped carded web in a textile card;



dividing the second carded web into relatively narrow rovings and forming a plurality of groups containing a plurality of the rovings with each group containing rovings from different areas across the width of the second carded web for evening the fiber distribution and weight in each such group of rovings; and

combining all of the rovings of each group with each other and forming a sliver of such rovings for use in spinning yarn in an open-end spinning machine without the necessity of subsequent doublings and draftings.

4,051,576

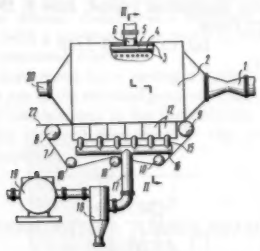
APPARATUS FOR AERODYNAMICALLY FORMING A FIBROUS SHEET MATERIAL

Sergei Vyacheslavovich Baburin, poselok Pravdinsky, ulitsa Zhdanova, 19, kv. 26, Moskovskaya oblast, Pushkinsky raion; Vasily Ivanovich Akimov, "Serebryanka", 9, kv. 69, Pushkino Moskovskoi oblasti, mikroraion; Vladimir Alexandrovich Gorbushin, Turisticheskaya uiltsa 13, kv. 19, Khotkovo Moskovskoi oblasti; Alexandr Petrovich Muraviev; Valery Nikolaevich Nepein, both of poselok Pravdinsky, Institutsky proezd, 1, Moskovskaya oblast, Pushkinsky raion; Mikhail Vladimirovich Frolov, Varshavskoe shosse, 16, kv. 235, Moscow; Sergei Arnoldovich Aizenberg, ulitsa Dmitrova, 11/67, kv. 136, Leningrad; Evgeny Mikhailovich Golovko, Krasnoputilovskaya ulitsa 28/29, kv. 58, Leningrad; Alexandr Fedorovich Kamenev, Bukharestskaya ulitsa 7, kv. 232, Leningrad, and Igor Alexandrovich Sergeev, prospekt Stachek, 27, kv. 8, Leningrad, all of U.S.S.R.

Filed Dec. 18, 1975, Ser. No. 642,120

Int. Cl.[2] D04H *1/00*

U.S. Cl. 19—156 **3 Claims**



1. An apparatus for making sheets of fibrous material comparising: a forming chamber having perforated inner walls on top and on two opposite sides and solid outer walls spaced from said inner walls and defining a space therebetween for receiving a gas under pressure, means for supplying said gas under pressure into said space for entry into said chamber through the perforations in the inner walls to maintain the fibers from contacting said inner walls of said chamber during operation, a bottom wall of said forming chamber comprising an endless air-permeable travelling conveyor extending along the entire length thereof, means for feeding an air stream mixture with fibers into the interior of said forming chamber and flowed between said two opposite sides, means for applying an air suction through said conveyor to settle fibers thereon in the form of a sheet material, and a means for removing fibers from said chamber that have not settled on said conveyor.

4,051,577

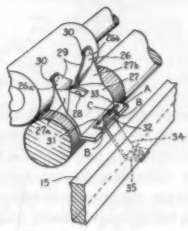
FIBER CONDENSER

Kenneth P. Swanson, Fort Lauderdale, Fla., assignor to Progressive Equipment, Inc., Simpsonville, S.C.

Filed Feb. 27, 1976, Ser. No. 662,022

Int. Cl.[2] D01H *5/72*

U.S. Cl. 19—291 **5 Claims**



1. A fiber condenser for feeding a fiber strand forwardly into the nip formed by a pair of superposed rolls comprising:

upper and lower arcuate coverging members having surfaces conforming generally with and positionable in superposed relation to respective nip forming roll surfaces;

a strand guiding delivery opening defined by said upper and lower members;

a flange connected to said lower arcuate converging member extending rearward therefrom;

transversely spaced abutment means carried by said flange for limiting transverse movement of said condenser in either direction;

said abutment means being defined by a slot; and

a bracket carried adjacent the rolls having a free end extending into said slot for limiting transverse movement of said condenser;

whereby upon said fiber strand coming down the tendency for said condenser to move transversely out of engagement with the rolls, as is normally restrained by the fiber strand, may be overcome by the limitation in movement of the condenser afforded by the spaced abutment means.

4,051,578

COMBINATION HANGER AND CLAMP MEMBER FOR BEDSIDE DRAINAGE BAG

James G. Manschot, Mukwonago; Byron L. Mather, Milwaukee, and Thomas W. Balistreri, Hales Corners, all of Wis., assignors to Plastronics, Inc., Milwaukee, Wis.

Filed Dec. 29, 1975, Ser. No. 644,534

Int. Cl.[2] F16G *11/00*

U.S. Cl. 251—4 **4 Claims**

1. A combination hanger and clamp member for a drainage bag having an inlet tube connected to the top portion of the bag comprising:

a bag retaining portion adapted to engage and support the drainage bag in a substantially vertical hanging position; and

a hanger clamp portion including an inverted U-shaped body portion adapted for hanging engagement with a support member, said inverted U-shaped body portion comprised of a pair of leg portions with one of said leg portions being integral with said bag retaining portion and the other of said leg portions terminating at a tip portion,

said body portion having an elongated slot therein extending from one leg thereof to the other leg thereof, said slot being wide enough to freely accommodate said inlet tube therein and said slot tapering inwardly at one end thereof to a narrow clamping slot in which said tube can be forced and when so positioned will clamp the tube to a restricted position and thereby effectively prevent flow there-

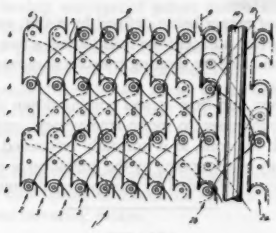
through, said clamping slot located in said other leg portion of said U-shaped body portion and terminating at said tip portion of said other leg portion, said tube when in the clamped position extending across the U-shaped body portion of the hanger member to thereby effectively prevent the bag from being inadvertently place in its operable hanging position while the tube is still clamped shut.

4,051,579

SLIDE FASTENER SUPPORT AND METHOD OF WARP-KNITTING SAME

Helmut Heimberger, Locarno, Switzerland, assignor to Optilon W. Erich Heilmann GmbH, Cham, Switzerland

Filed Sept. 30, 1976, Ser. No. 728,132
Claims priority, application Germany, June 15, 1976, 2626664
Int. Cl.[2] D04B *21/00*; A44B *19/00*
U.S. Cl. 24—205.16 R **13 Claims**



1. A slide-fastener support tape comprising:
a relatively thin first warp yarn forming a longitudinally extending double wale and having a succession of loops defining courses;
a plurality of relatively thin second warp yarn forming an array of longitudinally extending and transversely spaced single wales adjacent said double wale and each having a succession of loops at every other of said courses;
a blind-lapped relatively thick warp yarn extending longitudinally between said double wale and the adjacent single wale at the edge of said array of single wales;
a plurality of first weft yarns each laid into a plurality of said single wales;
a second weft yarn lapped into said double wale and said adjacent single wale, and lying to one side of said thick warp yarn; and
a third weft yarn lapped into said double wale and said adjacent single wale and lying to the other side of said thick warp yarn.

4,051,580

METHOD AND APPARATUS FOR STUFFING YARNS

Pierre Curtillat, Lyon, France, assignor to Rhone-Poulenc-Textile, Lyon Cedex, France

Filed Dec. 30, 1975, Ser. No. 645,389
Claims priority, application France, Dec. 31, 1974, 74.43588
Int. Cl.[2] D02G *1/20, 1/16*; D02C *1/12*
U.S. Cl. 28—255 **8 Claims**

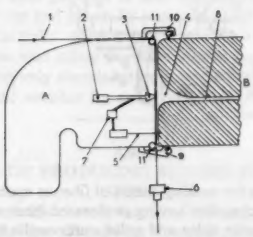
1. The Method of stuffing yarn comprising the steps of:
a. injecting yarn into an elongated zone by means of a compressed fluid driving and agitating the yarn,
b. confining the yarn and the fluid for travel longitudinally in said elongated zone,
c. compacting the yarn into an accumulating stuffing,
d. venting the fluid laterally from the elongated zone immediately upstream of the stuffing as the stuffing accumulates,
e. blocking venting of the fluid progressively as the stuffing accumulates,
f. expelling the accumulated stuffing abruptly as fluid pressure builds behind the stuffing to release the accumulated stuffing from the elongated zone so that the stuffing emerges peristaltically from the elongated zone and venting of the fluid is increased, and
g. repeating steps (a) through (g) continuously to form an elongated package of stuffed yarn.

4,051,581

DEVICE FOR INTRODUCING A YARN INTO A PNEUMATIC YARN TEXTURIZING MEANS

Bernard Biot, Craponne, and Charles Blanc, Couzon-au-Mont-D'Or, both of France, assignors to Rhone-Poulenc-Textile, Paris, France

Division of Ser. No. 692,766, June 4, 1976. This application Aug. 30, 1976, Ser. No. 718,771
Claims priority, application France, June 6, 1975, 75.17993; June 6, 1975, 75.17994
Int. Cl.[2] D02G *1/16*
U.S. Cl. 28—272 **4 Claims**



1. An apparatus for introducing at least one yarn into a pneumatic yarn texturizing means, said apparatus comprising:
an orifice for introducing yarn into the texturizing means;
a fluid nozzle fixed in spaced relation opposite said orifice;
means for positioning the yarn to extend across and between the orifice and fluid nozzle;

means for supplying liquid under high pressure to said fluid nozzle whereby said liquid pushes said yarn into said orifice after the liquid escapes the nozzle;

yarn cutting means for cutting the yarn, said yarn cutting means being located downstream of the orifice in the direction of yarn extent across the orifice;

means for synchronizing the operation of the liquid supply means with the yarn cutting means; and

means for mounting the fluid nozzle and cutting device so as to be moved from juxtaposition with the orifice after the yarn is introduced through the orifice and into the texturizing device so as to allow texturizing to take place under usual conditions.

4,051,582

TECHNIQUES FOR PRODUCING AN ACOUSTO-OPTICAL COMPONENT OR A WIDE-BAND ULTRASONIC COMPONENT

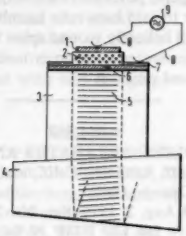
Hans Eschler, and Rudolf Oberbacher, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 16, 1975, Ser. No. 641,382

Claims priority, application Germany, Dec. 19, 1974, 2460207

Int. Cl.² H01L *41/22*

U.S. Cl. 29—25.35 **18 Claims**



1. A process for producing an ultrasonic component which comprises a piezoelectric transducer and a sound medium, comprising the steps of:

smoothing a surface of the sound medium and a surface of the piezoelectric material to a degree of smoothness which is well below that of a Newton ring;

cleaning the smoothed surfaces;

applying a first metal layer having a thickness in the range of 0.5–2 nm to each of the cleansed surfaces;

applying a second metal layer having a thickness in the range of 5–20 nm to each of the first metal layers;

bonding the second metal layers together by molecular adhesion with a portion of the metal layers of the sound medium remaining exposed;

applying a third metal layer having a thickness in the range of 0.3–0.6 μm to the exposed portion of the metal layers of the sound medium and to the piezoelectric material; and

adjusting the resonant frequency of the transducer to a desired frequency.

4,051,583

MACHINE TOOL WITH A TURRET HEAD FOR TOOL SPINDLES

Shiro Kato, Kariya, and Yasuhiro Hattori, Nagoya, both of Japan, assignors to Toyoda-Koki Kabushiki-Kaisha, Japan

Filed Mar. 22, 1976, Ser. No. 668,862

Claims priority, application Japan, Apr. 28, 1975, 50-51687

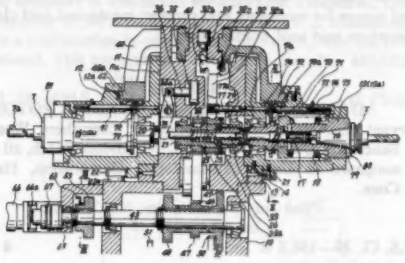
Int. Cl.² B23B *39/20*

U.S. Cl. 29—40 **7 Claims**

1. A machine tool having a frame, a turret head rotatably mounted upon the frame, a plurality of tool spindles rotatably supported within the turret head, index means for indexing the turret head to selectively position the tool spindles to an operative position, first coupling means provided upon each of the tool spindles, second coupling means slidably and rotatably provided upon the frame for rotating any one of the tool spindles positioned at the operative position when engaged with the first coupling means of the said any one of the tool spindles, and orienting means for positioning the second coupling means to a predetermined angular position, the improvement comprising:

first engaging means provided upon at least a particular one of the tool spindles,

second engaging means slidably mounted within the turret head and engageable with the first engaging means when the said one of the tool spindles is positioned to the predetermined angular position for maintaining the same thereat,



means for moving the second engaging means into engagement with the first engaging means,

release means operably disposed within the frame for moving the second engaging means out of engagement with the first engaging means against the last mentioned means when brought into abutting engagement with the second engaging means,

a lever member operably supported and connected with the second coupling means and the release means for simultaneously moving the second coupling means and the release means respectively into engagement with the first coupling means and the second engaging means, and

an actuator connected with the lever member for operating the same.

4,051,584

CUTTING TOOL ASSEMBLY

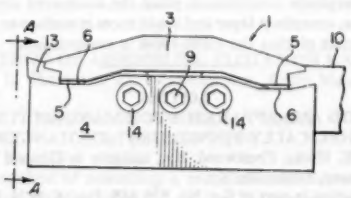
Josef Paul Huser, Meggen, Switzerland, assignor to Firma Utilis Mullheim A.G., Switzerland

Filed Oct. 24, 1975, Ser. No. 625,712

Claims priority, application Switzerland, Oct. 24, 1975, 014284/75

Int. Cl.² B26D *1/00*

U.S. Cl. 407—107 **24 Claims**



1. A cutting assembly comprising: a cutting tool means, a tool holder means, a support means for supporting said cutting tool means, clamping means for clamping said cutting tool means on said support means, said support means and said clamping means being provided with two opposed longitudi-

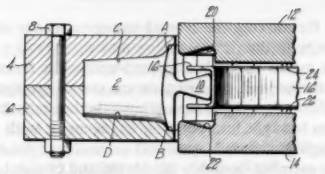
nally extending surfaces, means provided on the opposed surfaces of said support means and said clamping means for receiving and accurately guiding said cutting tool means, guide means projecting outwardly from one of the opposed surfaces of said clamping means and said support means for laterally aligning said clamping means relative to said support means, groove means provided on the other of the opposed surfaces of said clamping means and said support means for receiving said guide means, means provided on one of the opposed surfaces of said support means and said clamping means for vertically aligning said clamping means relative to said support means, said guide means, said groove means and said means for vertically aligning said clamping means being arranged on said opposed surfaces substantially along a vertically extending center plane of said clamping means and said support means, and means for mounting said support means and said clamping means on said tool holder means.

4,051,585

METHOD OF FORMING A TURBINE ROTOR

Bryant H. Walker, Stuart; William D. Carruthers, West Palm Beach, and Donald G. MacNitt, Jr., Riviera Beach, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed July 26, 1976, Ser. No. 708,672
Int. Cl.² B23P *15/04*
U.S. Cl. 29—156.8 R **4 Claims**



1. Method of forming a turbine rotor having a superalloy disk with ceramic blades, including the steps of:
1. forming ceramic blade members having a root section with an enlargement thereon,
2. holding said ceramic blades together with the root sections projecting radially inward,
3. placing a compliant layer around said root sections,
4. forming two disk halves of a wrought superalloy having a fine grain size microstructure which can be placed in a superplastic condition,
5. contouring the outer circumference of each disk half to accommodate the ceramic blade root and compliant layer,
6. aligning said disk halves so that the contoured circumferences will contact the compliant layer,
7. placing said disk halves in a superplastic condition,
8. pressing said disk halves together while they are in said superplastic condition to place the contoured circumference, compliant layer and blade roots in surface-to-surface contact placing the blade roots in compression.

4,051,586

METHOD AND APPARATUS FOR MANUFACTURING A HELICALLY FINNED HEAT EXCHANGER

Robert E. Hicks, Crestwood, Ky., assignor to General Electric Company, Louisville, Ky.

Continuation-in-part of Ser. No. 529,445, Dec. 4, 1974, Pat. No. 3,909,898, which is a continuation-in-part of Ser. No. 579,889, May 22, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,833
Int. Cl.² B21D *53/02*; B23P *15/26*
U.S. Cl. 29—157.3 AH **1 Claim**

1. Method of manufacturing a continuous spine fin heat exchanger tube including a helically wound spine fin material supported on a base tube member which comprises:
helically winding said spine fin material in intimate contact with adjacent wraps and the outer wall of said tube;
moving spine fins from adjacent wraps of said spine fin material into interlocking engagement in preselected portions at spaced intervals on said spine fin heat exchanger so as to prevent movement thereof relative to said base tube member;

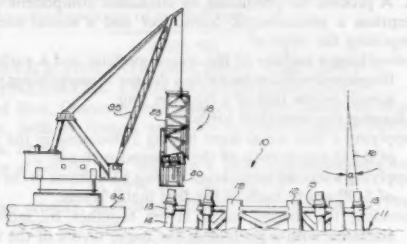
severing said heat exchanger in said preselected portion to form predetermined lengths of said heat exchanger with the interlocked spine fin material in said preselected portions forming end portions effectively held against movement relative to said base tube member so that the other portion of said helically wound spine fin material intermediate said preselected portion is maintained in its initial helically wound position.

4,051,587

PILE HANDLING APPARATUS AND METHODS

George I. Boyadjieff, Anaheim, Calif., assignor to Varco International, Inc., Orange, Calif.

Filed Aug. 2, 1976, Ser. No. 710,450
Int. Cl.² B23P *19/04*
U.S. Cl. 29—240 **20 Claims**



1. A pile handling tool comprising:
a portable support structure adapted to be moved to a location at which a pile is to be lowered or raised;
power actuated jacking mechanism carried by said support structure and constructed to jack a pile section longitudinally relative to the support structure;
a mast structure carried by said support structure and projecting upwardly beyond said jacking mechanism; and
pile aligning means carried by said mast structure and adapted to engage the pile section in aligning relation at a location above the jacking mechanism.

4,051,588

MACHINE FOR DISASSEMBLING WOOD PALLETS

Neil E. Conkle, 1000 Clarendon, Columbus, Ohio 43223

Filed Dec. 2, 1975, Ser. No. 636,932
Int. Cl.² B23P *19/04*
U.S. Cl. 29—252 **6 Claims**

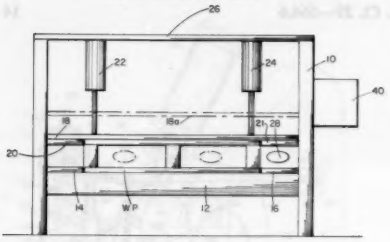
1. A machine for disassembling wood pallets of the type

having deck and base boards and stringers comprising a structure including:

a platform for placing said pallet thereon;

an engaging arm and means for positioning said arm above said platform at a height of said stringers;

a shaft having said arm movably positioned thereon for movement of said arm laterally from one side of said structure to the other side;



drive means for moving said arm to engage said stringers;

a stop on said platform to restrict said pallet placed on said platform from lateral movement;

a plate movable vertically to contact the upper deck to restrict said pallet from vertical movement when said arm is in engagement with said stringers.

4,051,589

PROCESS AND APPARATUS FOR THE ASSEMBLY OF SLIDING GATE VALVE UNITS FOR CASTING LADLES

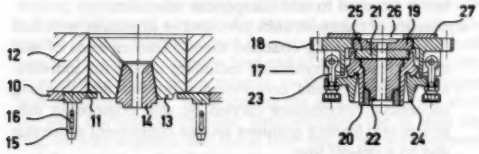
Bernhard Tinnes, Zollikerberg, Switzerland, assignor to Metacon AG, Zurich, Switzerland

Filed May 16, 1975, Ser. No. 578,315

Claims priority, application Switzerland, May 24, 1974, 7108/74

Int. Cl.² B23P *17/00*

U.S. Cl. 29—405 **3 Claims**



1. A process for assembling a sliding gate valve unit including a valve housing and slide part for a casting ladle, comprising:

with the unit separated from the ladle and in a substantially disassembled condition,

a. heating the valve housing and slide part to an elevated temperature approximately corresponding to the mean temperature of the unit when in use on a casting ladle, the heating step including applying radiant heat to the valve housing;

b. mounting the slide part to the valve housing with a fastening means and

c. tightening the fastening means to the extent needed to provide a predetermined degree of tightness between the slide part and the valve housing, all while these parts remain heated;

the unit, when assembled, including a bed plate set in mortar, in the valve housing the process further including:

applying mortar to the bed plate;

setting the bed plate in the valve housing while the valve housing remains heated, before performing step (b) and permitting the mortar to set at elevated temperature;

mounting the valve housing on edge so that it faces sideways for the performance of steps (a), (b) and (c), the mounting step further including:

mounting the valve housing on a frame having an oven enclosure, with the ladle side of the valve housing facing into the oven and with the opposite side thereof accessible from exteriorly of the oven.

4,051,590

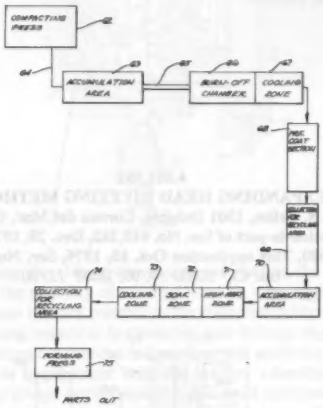
METHOD FOR HOT FORGING FINISHED ARTICLES FROM POWDER METAL PREFORMS

Richard F. Halter, and Richard L. DeWeese, both of Cincinnati, Ohio, assignors to Cincinnati Incorporated, Cincinnati, Ohio

Continuation of Ser. No. 298,832, Oct. 19, 1972, abandoned, which is a continuation-in-part of Ser. No. 91,419, Nov. 20, 1970, abandoned. This application May 8, 1974, Ser. No. 468,002

Int. Cl.² B22F *3/24*

U.S. Cl. 29—420.5 **16 Claims**



1. A fully automated, continuous process of producing finished parts from compacted powder metal preforms at a high production rate which comprises the steps of introducing the preforms into a vertically oriented tube-like feeding station, depositing the preforms from said feeding station to a conveying means one-by-one by gravity, conveying said preforms to a vertically oriented induction heating station, advancing said preforms through said heating station and heating them to at least a forging temperature, transferring a heated preform from the upper end of said heating station to a forging station and simultaneously removing a finished part from said forging station, and forging each of said preforms at said forging station.

4,051,591

METHOD OF ASSEMBLING FLOTATION UNITS

Thomas L. Thompson, 2231 Pomona Ave., Costa Mesa, Calif. 92627

Filed Dec. 20, 1976, Ser. No. 752,824

Int. Cl.² B23P *19/04*

U.S. Cl. 29—433 **9 Claims**

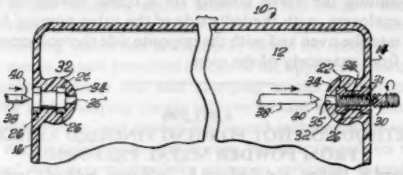
1. A method of assembing a monolithic, hollow structure comprising the steps of:

forming a monolithic unit having a sealed chamber defined thereby;

arranging a plurality of threaded bushing inserts in at least two oppositely disposed walls of said unit, wherein a pair of oppositedy disposed bushing inserts are axially aligned with each other;

passing a guide rod through said bushings from one side of said unit to the other, whereby said guide rod extends outwardly from one side wall thereof;

engaging a continuously threaded, support bar to said extended end of said guide rod;



rotating said threaded, support bar so as to cause it to be threaded through said oppositely disposed, bushing inserts during continuous engagement with said guide rod; and

adjusting said support rod to provide outwardly projecting ends, said ends being adjusted equidistant from said side walls thereof.

4,051,592

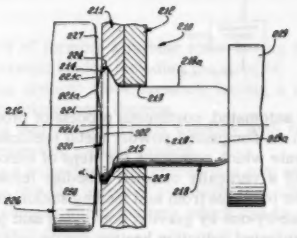
EXPANDING HEAD RIVETING METHOD

Franklin S. Briles, 1301 Dolphin, Corona del Mar, Calif. 92625

Continuation-in-part of Ser. No. 645,242, Dec. 29, 1975, Pat. No. 4,000,680. This application Oct. 15, 1976, Ser. No. 732,869

Int. Cl.[2] B21D *39/00*; B23P *11/00*

U.S. Cl. 29—509 **6 Claims**



1. In the method of securing a metallic rivet to work containing a through bore, and first and second counterbores;, said second counterbore being frusto-conical and tapering forwardly between the first counterbore and the bore, the rivet having a head at one side of the work, and an axially extending shank extending through the bore, the shank having a terminal protruding at the opposite side of the work, the rivet head having an end face defining a ring-shaped dome extending about the rivet axis and in substantial alignment with the outer surface of the shank, the steps that include

a. seating the rivet head against the work second counterbore while maintaining only slight annular clearance between the work first counterbore and the rivet head, and with the shank then extending through the bore,

b. expanding the rivet head radially outwardly to tightly engage the work first counterbore, said expansion of the rivet head being effected by applying force to said ring-shaped dome to flatten said dome and

c. maintaining the head substantially confined within the first and second counterbores during said radial expansion.

4,051,593

COMPONENT MOUNTING APPARATUS

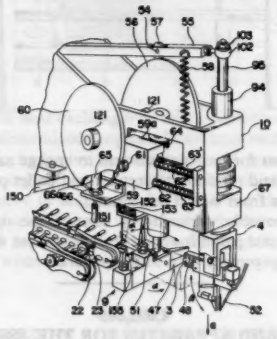
Kazuhiro Mori, and Yoshihiko Misawa, both of Katano, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 2, 1976, Ser. No. 672,958

Claims priority, application Japan, Apr. 7, 1975, 50-42650; Apr. 7, 1975, 50-42651; Jan. 30, 1976, 51-9858; Jan. 30, 1976, 51-9859; Jan. 30, 1976, 51-9860; Jan. 30, 1976, 51-9865

Int. Cl.[2] H05K *3/32*

U.S. Cl. 29—564.6 **14 Claims**



1. Component mounting apparatus comprising

a plurality of stands for accommodating a plurality of component substrates in ribbon-like form and carrying different components having leads attached to and extending therefrom, end portions of the leads of said components being attached to said component substrates;

a plurality of transport units provided in alignment with said stands, and having attached thereto leading ends of said component substrates and including means for individually advancing said component substrates and bringing successive components carried by said component substrates into leading positions on said component substrates and to a cut-off line;

a component selection block laterally movable for bringing a selected component substrate carrying a component required to be mounted into line with a cut-off station;

a cutter and transfer unit at said cut-off station, for cutting said leads of said leading component of said selected component substrate, thereby detaching said component from said component substrate, and for transporting said detached component to a transfer station and subsequently releasing said component;

printed circuit board positioning means for supporting a printed circuit board and moving said printed circuit board for bringing successive portions of said printed circuit board requiring successive said components to be mounted thereon to an insertion station;

an insertion unit for receiving and holding a component brought to said transfer station by said cutter and transfer unit, said cutter and transfer unit releasing said component when said component is held by said insertion unit, and for moving said received component toward and guiding said leads of said component into a printed circuit board portion at said insertion station.

4,051,594

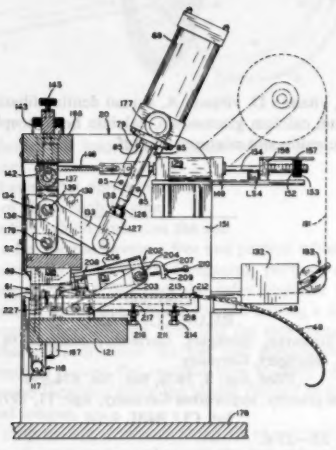
METHODS AND APPARATUS FOR USE IN MAKING ELECTRICAL INTERCONNECTIONS

Alan L. Kindig, Holland, Mich., assignor to General Electric Company, Fort Wayne, Ind.

Continuation-in-part of Ser. No. 671,618, March 29, 1976, which is a continuation-in-part of Ser. No. 590,707, June 26, 1975, Pat. No. 3,962,780. This application June 23, 1976, Ser. No. 698,922

Int. Cl.² H02K *15/00*; H01R *43/04*

U.S. Cl. 29—596 **10 Claims**



1. Apparatus for making an electrical interconnection with at least one magnet wire segment extending from a winding supported on the core of a dynamoelectric machine, wherein the interconnection comprises a crimped splice connector folded upon the at least one magnet wire segment at least one filler wire segment, and at least one other wire segment and wherein the at least one magnet wire segment, the at least one other wire segment, and an uncrimped splice connector are positioned at a crimping station; the apparatus including means for advancing uncrimped splice connectors to the crimping station; means for advancing a filler wire segment comprising a first portion and a remainder toward and into the crimping station a total predetermined distance along a confined pathway and for positioning the lead end of the filler wire segment in overlying relationship relative to the at least one magnet wire segment; means for crimping the splice connector about the first portion of the filler wire segment, the at least one magnet wire segment, and the at least one other wire segment, and for severing the first portion of the filler wire segment from the remainder of the filler wire segment thereby to establish a new filler wire segment end; and control means for causing retraction of the remainder of the filler wire segment along the confined pathway a distance less than the predetermined distance and thereby ensuring that the remainder of the filler wire segment is devoid of major bends therealong.

4,051,595

METHODS FOR SETTING INSULATORS AND PRESSING END TURNS

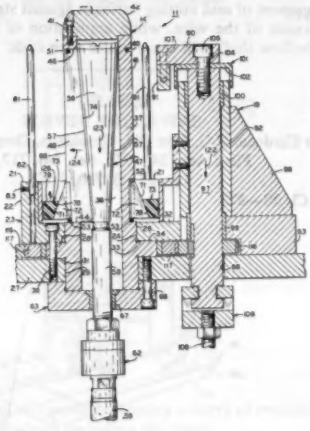
Richard W. Bale, Fennville, Mich., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 593,491, July 7, 1975, Pat. No. 4,003,116. This application Nov. 11, 1976, Ser. No. 740,830

Int. Cl.² H02K *15/06*

U.S. Cl. 29—596 **1 Claim**

1. A method of setting at least one insulating wedge in a stator assembly by moving wedge setting means, including an elongate surface, radially relative to the stator assembly while the elongate surface is in engagement with the wedge, and thereby moving at least part of the wedge in a radial direction relative to an axially extending slot of a stator core; and substantially simultaneously therewith changing the shape of at least part of the end portions of a plurality of winding turns supported on the core by moving means for shaping end portions of winding turns while the means for shaping is in pressing engagement with such at least part of the end portions, the method comprising: positioning the stator assembly in predetermined relation to radially movable wedge setting means including the elongate surface at a first station; holding the stator assembly in fixed relation to the wedge setting means and, while so holding the stator assembly, generally concurrently setting the at least one wedge and shaping the at least a portion of the plurality of winding turns by moving the wedge setting means radially relative to the stator assembly while the wedge setting means is in camming and driving engagement with the means for shaping end portions and while the elongate surface is in engagement with the wedge, whereby radially moving the wedge setting means causes axial movement of the means for shaping end portions and associated shaping of winding turn end portions engaged thereby and also causes radial movement of the elongate surface and setting of a wedge engaged thereby; and thereafter moving the stator assembly away from the wedge setting means.



4,051,596

WIRE CUTTER, PARTICULARLY FOR CUTTING ELECTRICAL CONNECTION WIRES

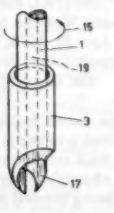
Heinrich Hofmann, Biebertal, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 2, 1976, Ser. No. 719,987

Claims priority, application Germany, Sept. 10, 1975, 2540299

Int. Cl.² B23D *29/02*

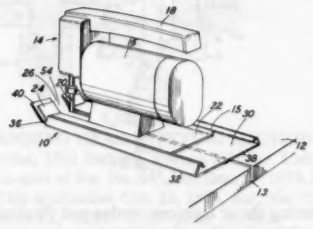
U.S. Cl. 30—133 **3 Claims**



1. A wire cutter especially adapted for cutting stranded wires comprising a circular cylindrical outer sleeve having an

end face and a cutting edge extending parallel to the sleeve axis beyond the end face, a distal tip of the cutting edge being connected to the end face by a surface extending generally helically away from the cutting edge; and a hollow cutting shaft arranged coaxially within said sleeve for rotation relative thereto and having a cutting edge extending to a distal tip at an axial location corresponding to said sleeve tip, said cutting edge extending parallel to the shaft axis at a region adjacent the shaft tip, said shaft cutting edge extending away from said tip and said region along an arch, adjacent said cutting edge said shaft having an end face so shaped that a wire portion to be cut is held inside a space between the shaft and sleeve, whereby rotation of the shaft relative to the sleeve for operative cutting engagement of said cutting surfaces against stranded wire cuts all strands of the wire, while application of suction through said hollow shaft will remove cut wire ends.

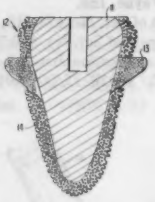
4,051,597
SAW GUIDE DEVICE
Louis Cardoza, P.O. Box 488, Brookings, Oreg. 97415
Filed Aug. 24, 1976, Ser. No. 717,033
Int. Cl.[2] B27B *11/02*
U.S. Cl. 30—373 **3 Claims**



1. A saw guide used for producing a straight line kerf cut in a board with a saw having a saw blade, a motor housing, a handle, and a shoe, said shoe having upwardly extending side flanges and an upwardly bent forward end, which comprises:
   a. a rectangularly shaped planar element having a pair of sides, a forward end, and rear end, said planar element adapted to receive said shoe thereon;
   b. means for retaining said shoe on said planar element, said retaining means including an L-shaped member affixed to each said side of said planar member, each said L-shaped member tilted inwardly over said planar element, each said L-shaped member adapted to slidably receive a corrsponding said side flange provided by each side of said shoe for retaining said planar member upon said shoe;
   c. means for extending said saw blade through said forward end of said planar element; and
   d. a block element affixed perpendicularly to a bottom rear center surface of said planar element, said block element adapted to be received in said kerf cut rearwardly of said saw blade.

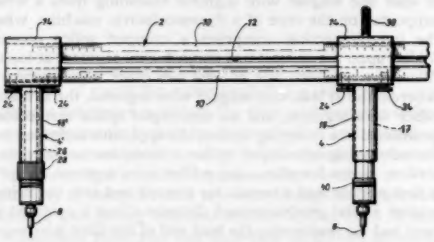
4,051,598
DENTAL IMPLANTS
Meer Sneer, 24 Baalei Melacha St., Tel-Aviv, Israel
Filed Apr. 22, 1975, Ser. No. 570,380
Claims priority, application Israel, Apr. 23, 1974, 44697
Int. Cl.[2] A61C *13/00*
U.S. Cl. 32—10 A **1 Claim**

1. An endosseous dental implant comprising a lower part, adapted to be inserted into the jaw bone, and having a surface layer 100 to 400 μ thick and of open structure comprising pores or interconnected channels of size of about 50 to about 250 μ, said surface layer being formed predominantly of a mixture of physiologically acceptable plastic and an osteogenesis enhancing catalyst selected from the group consisting of calcium carbonate, tricalcium phosphate, calcium fluoride, tribasic calcium phosphate, monobasic calcium phosphate, calcium glycero-phosphate, calcium lacticum, sodium fluoride, total bone substance, magnesium silicate, aluminum silicate, ascor-



bic acid, vitamin D, vitamin A, animal dentin, dibasic calcium phosphate, calcium glucosicum, calcium hexaphosphate, caoline, zinc oxide and mixtures thereof.

4,051,599
BEAM COMPASS
Andrej Sinkovec, Stuttgart, Germany, assignor to Friedrich Frech, Stuttgart, Germany
Filed Apr. 8, 1976, Ser. No. 674,895
Claims priority, application Germany, Apr. 11, 1975, 2515923
Int. Cl.[2] B43L *9/04*
U.S. Cl. 33—27 C **11 Claims**



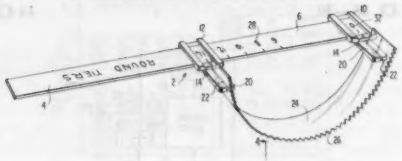
1. A beam compass comprising:
   a. a trammel head including
      1. a hollow slide body having an outer face and three, approximately equiangularly offset inner faces bounding a passage extending in a predetermined direction through said slide body,
      2. a guide rail projecting from each of said inner faces into said passage, each guide rail being elongated in said direction,
      3. an arm mounted on said slide body and projecting from said outer face perpendicularly to said direction, said arm having a free end remote from said slide, and
      4. attaching means for attaching a compass point to said free end;
   b. an elongated scale of triangular cross section having three longitudinal faces formed with respective longitudinal grooves,
      1. said scale being received in said passage,
      2. said rails respectively engaging said scale in said grooves,
      3. each of said longitudinal faces being separated from a respective one of said inner faces by a clearance; and
   c. clamping means on said trammel head spaced from said rails for securing said slide body to said scale.

4,051,600

GARLAND MARKER FOR FANCY CAKES

Ray Haapala, Rte. 3, Box 76, Dassel, Minn. 55325

Filed Sept. 22, 1976, Ser. No. 725,646
Int. Cl.² G01B 5/20
U.S. Cl. 33—174 T 1 Claim



1. A device for inscribing garlands on the sides of cakes, comprising

a rod having flat opposite sides

a pair of slides each having

a portion which embraces the rod

and a flat tongue having a free end portion which extends outwardly from the rod-engaging portion, each said tongue having flat opposite sides disposed in planes parallel to the flat sides of the rod having a slot which extends therethrough from one flat side thereof to the other inwardly from the free end portion thereof, an elongate bowed flat resilient strip slidably engaged at spaced locations along the length thereof in the slots in said tongue,

said strip having serrations along an edge thereof,

a series of graduated numbers on the one side of said rod representing an even number of garlands inscribable on the side of a round cake tier of a given diameter, and

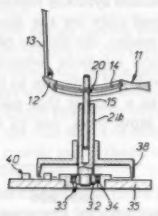
a series of graduated numbers on the other side of said rod representing an even number of garlands inscribable on a side of a given length of a rectangular cake tier.

4,051,601

FEELER FOR CONTOUR READING APPARATUS

Jean Marie Godot, Brunoy, France, assignor to Essilor International, Cie Generale d'Optique, France

Filed Jan. 6, 1976, Ser. No. 647,313
Claims priority, application France, Jan. 10, 1975, 75.00635
Int. Cl.² G01B 7/28; B24B 9/14
U.S. Cl. 33—174 P 15 Claims



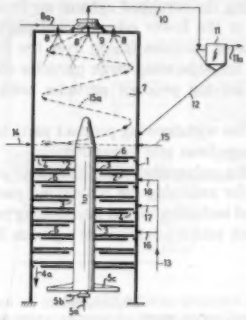
12. A feeler assembly comprising a tracing head for following the contour of a groove in the rim of spectacle frame, a support member, said support member including an end portion remote from said tracing head; means mounting said tracing head on said support member, a base member, ball joint means mounting said support member on said base member, said ball joint means being disposed at said end portion of said support member remote from said tracing head between said support member and said base member, a skirt member mounted on said support member intermediate said tracing head and said ball joint means and facing said base member, and detecting means for detecting the position of said skirt member with respect to said base member in response to displacements of said tracing head in the groove of a spectacle frame rim.

4,051,602

KILN FOR THE THERMAL TREATMENT OF SLURRY TYPE MATERIALS SUCH AS MAGNESITE

Vladimir Suprunov; Alfred Kryczun, and Theodor Manshausen, all of Cologne, Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Feb. 2, 1976, Ser. No. 654,643
Claims priority, application Germany, July 4, 1975, 2529847
Int. Cl.² F26B 3/08, 17/00
U.S. Cl. 34—10 10 Claims



7. The method of thermally treating a slurry of material such as a magnesite hydrate including the steps:

spraying the material into the upper end of a kiln chamber at the roof;

introducing heated gases in a distributed pattern at a first location tangentially at the lower end of an upper portion to flow upwardly countercurrent to the downward movement of the sprayed slurry of material and drying over the entire area of the chamber;

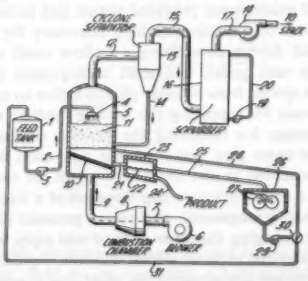
drawing off evaporated moisture at the top of the chamber; and removing the heat treated material from the lower end of the chamber.

4,051,603

FLUIDIZED BED APPARATUS

Hobart Malcolm Kern, Jr., Warren, Pa., assignor to Struthers Scientific and International Corporation, New York, N.Y.

Continuation of Ser. No. 375,949, July 2, 1973, abandoned, which is a continuation of Ser. No. 260,148, June 6, 1972, abandoned. This application July 15, 1974, Ser. No. 488,637
Int. Cl.² F26B 17/10
U.S. Cl. 34—57 A 2 Claims



1. Apparatus for providing product particles of a desired size

in a fluidized bed dryer from an aqueous feed solution comprising:

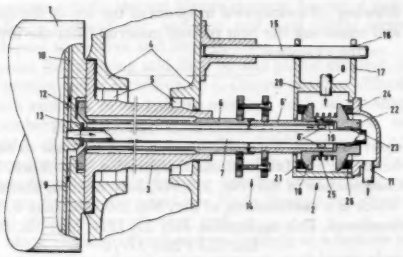
a. a chamber to contain a fluidized bed;
b. a perforated plate beneath said bed positioned at an incline;
c. means for passing heated air upward in said chamber through said plate;
d. means for spraying an aqueous solution of feed into the chamber forming a fluidized bed therein in which drying particles aggregate and grow as they are coated and/or stick together;
e. means for separating out fines from the exhaust air from said chamber and returning said fines directly to said bed and means for subsequently scrubbing said exhaust air and removing the scrubbed exhaust air from the apparatus;
f. means at the lower edge of said plate for withdrawing aggregated particles falling from the fluidized bed;
g. means for separating large particles above a desired size range leaving product particles with the desired size range;
h. means for withdrawing product particles with the desired size range from said apparatus;
i. means for pulverizing all of the large particles; and
j. means for returning the pulverized particles to the fluidized bed including means introducing pulverized particles to a tank which contains the aqueous feed solution.

4,051,604

COUPLING FOR THE SUPPLY AND DISCHARGE OF HEATING MEDIUM, FOR EXAMPLE IN TENTERING UNITS

Hans Fleissner, Frankfurt am Main, Germany, assignor to Vepa AG, Switzerland

Filed July 2, 1975, Ser. No. 592,767
Claims priority, application Germany, July 2, 1974, 2431806
Int. Cl.[2] F26B *11/02*
U.S. Cl. 34—124 **15 Claims**



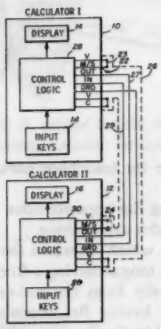
1. A coupling device for the supply and discharge of a heating medium in combination with a godet having a twin roll jacket and guide means provided within said jacket for directing the flow of a heating medium necessary for heating the godet, said device comprising a hollow shaft arrangement secured to said godet, said shaft arrangement including an outer pipe spaced from an inner pipe to define an annular space therebetween for supplying the heating medium to the godet and a passage for removing the heating medium from the godet, the outer pipe and the inner pipe each being permanently connected to one end of the godet for rotation therewith and a rotary pressure cap disposed at a free end of said hollow shaft arrangement, said rotary pressure cap including means for engaging the other ends of said pipes whereby said pipes are allowed to rotate within said rotary pressure cap, said engaging means also allowing the outer pipe to expand longitudinally due to temperature fluctuation and to cause movement of the rotary pressure cap relative to said godet.

4,051,605

COMPETITIVE EDUCATIONAL CALCULATOR

Ted William Toal, Sunnyvale, and Ralph Warren Haines, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Sept. 7, 1976, Ser. No. 720,538
Int. Cl.[2] G09B *19/02*; G06F *15/16*
U.S. Cl. 35—30 **14 Claims**



1. Apparatus for allowing two or more substantially identical calculators to operate in a competition mode comprising:

a. A first calculator having a display and manually-operable input keys;
b. Master/slave means at said first calculator for causing said calculator to operate as a master or a slave depending upon whether said means is energized or not, respectively;
c. Means adapted to interconnect said first calculator with a second calculator, including means energizable for designating said first calculator as the master, exclusively; and
d. Control means in said first calculator responsive to said master/slave means and said input keys for generating parameters describing a problem to be solved, said means being activated only upon the condition that said first calculator is energized as a master.

11. The method of operating first and second calculators in a competition mode, each of said calculators having a display and manually-operable input keys, comprising the steps of:

a. Interconnecting said first and second calculators in such a way that one of said calculators is energized as a master, the other of said calculators being a slave; and
b. Displaying function symbols representing a type of problem to be solved only on the display of the calculator energized as a master, the display of said slave not displaying said function symbols; whereby the fact that said symbols are displayed indicates to the user of said calculator energized as a master that said user is to select, by means of said input keys, one of the displayed function symbols.

4,051,606

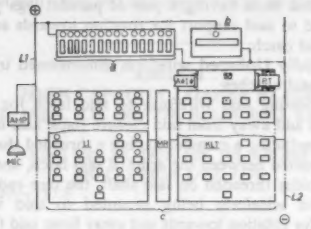
SELF-LEARNING APPARATUS FOR READING AND WRITING OF THE JAPANESE LANGUAGE

Nakamura Tozo, No. 32-3, 3-Chome, Kugahara, Ota, Tokyo, Japan (146)

Filed Jan. 26, 1976, Ser. No. 652,147
Claims priority, application Japan, Feb. 12, 1975, 50-16893
Int. Cl.[2] G09B *5/04*
U.S. Cl. 35—35 C **7 Claims**

1. A self-learning apparatus for reading and writing of the Japanese language comprising; a record-playing device having recorded therein vowels and consonants of the Japanese language; an identifying device coupled to said record-playing device and provided with an identifier having identifying relays for automatically identifying vocal cords vibrating sounds of vowels and consonants of the Japanese language

provided thereto; an electric motor-driven Japanese kana-letter typewriter having typing coils connected to said relays respectively, for automatically typing said identified vowels



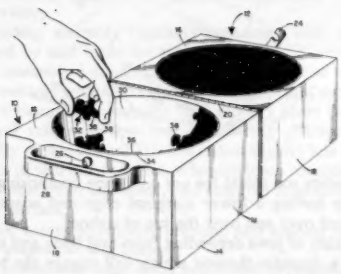
and consonants in the Japanese kana-letters and short-circuiting push-button switches connected to said identifying relays respectively, to operate said typewriter independent of said identifying relays.

4,051,607

CELESTIAL DISPLAY DEVICE

Roger J. Sullivan, 371 N. Edison St., Arlington, Va. 22203

Filed Aug. 20, 1976, Ser. No. 716,126
Int. Cl.² G09B *27/06*; A63F *9/10*
U.S. Cl. 35—43 **13 Claims**



1. A celestial display device comprising:

a. a support member having a concave, unobstructed upper surface, said upper surface being substantially shaped as a portion of a sphere;

b. a plurality of puzzle pieces having convex lower surfaces conforming to the concave curvature of said support member upper surface, said puzzle pieces having concave upper surfaces bearing celestial indicia, each said puzzle piece having side edges shaped to correspond with and to closely fit against the side edges of other said puzzle pieces to form a unitary puzzle in the shape of said upper surface when assembled together; and

c. said support member and said plurality of puzzle pieces including holding means for causing said puzzle piece lower surfaces to be removably maintained against said support member upper surface.

4,051,608

TEACHING MACHINE

Ernest R. Duncan, Harmony Hill Mount Harmony Road, Bernardsville, N.J. 07924

Division of Ser. No. 482,339, June 24, 1974, Pat. No. 3,974,575. This application Aug. 17, 1976, Ser. No. 715,113
Int. Cl.² G09B *7/00*
U.S. Cl. 35—48 A **9 Claims**

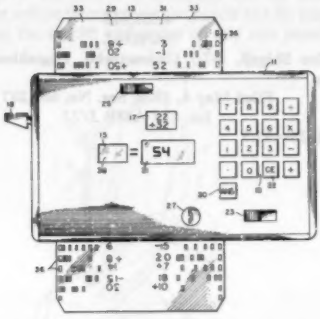
1. A card record member for use in a teaching machine comprising:

a column of visually readable problem statements recorded thereon in one of two predetermined positions;

a column of machine readable answers corresponding to said visually readable problem statements; and

means on said card record member for controlling the position of a mask in said teaching machine to cover one or the other of said predetermined column positions while said card is in said machine;

a second column of visually readable problem statements recorded in the opposite sense from said first column in the other of said predetermined column positions;



a second column of machine readable answers to the problem statements in said second column of visually readable problem statements;

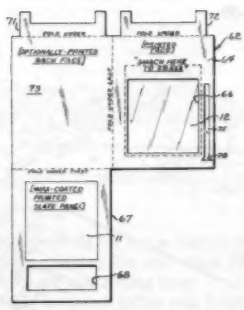
said columns of visually readable problem statements being recorded on either side of the center line of said card, and said columns of machine readable answers being recorded on either side of said columns of visually readable problem statements between said columns of problem statements and the edges of said card member for allowing said card record member to be inserted into said teaching machine in either direction.

4,051,609

METHOD OF MAKING REUSABLE WRITING BOARD AND THE PRODUCT THEREOF

Thomas P. Boursaw, 703 W. Victoria Ave., Arlington Heights, Ill. 60005

Filed July 23, 1976, Ser. No. 708,276
Int. Cl.² B43L *1/12*
U.S. Cl. 35—66 **16 Claims**



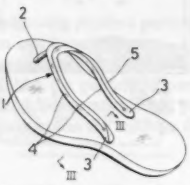
1. A reusable pressure-sensitive writing board of the type having cover sheet means overlying a background, initially loosely, adapted to cling to the background where impressed thereon and to then show, until reloosened, a contrast between

the clinging area and the nonclinging area, characterized by being formed, except for its cover sheet means, essentially from a single sheet of cardboard folded and including a back portion, a flap folded forwardly therefrom and down thereover and including on the forward face thereof a printed background with a pressure-tacky surface; and including a second flap folded forwardly from the same back portion and adhered down thereover, with face-printing on its forward face and having an edge overlying the first flap to provide a protected area thereof; the cover sheet means being adhered to said cardboard under the said second flap.

4,051,610
SANDAL

Yoshihiro Shigeji, 5-7-7 Okamotocho, Higashinadaku, Kobe, Japan

Filed May 4, 1976, Ser. No. 683,217
Int. Cl.[2] A43B *3/12*
U.S. Cl. 36—11.5 1 Claim

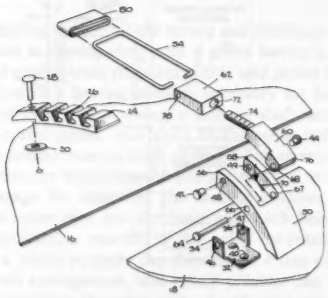


1. A sandal comprising:
a sole member means for supporting and protecting the sandal wearer's foot; and
thong member means removably attached to said sole member means for fitting over the wearer's instep and for selectively fitting over the wearer's instep and around the wearer's heel, said thong member means being comprised of:
a foot strap removably connected to said sole member means having a longitudinal slit therein forming two complementary adjacent straps integrally connected at their ends, one of said straps being selectively removable from the other and fitable around the wearer's heel.

4,051,611
BOOT BUCKLE

Edward L. Chalmers, Boulder, Colo., assignor to The Garcia Corporation, Teaneck, N.J.

Filed Jan. 24, 1977, Ser. No. 762,195
Int. Cl.[2] A43B *11/00*
U.S. Cl. 36—50 6 Claims

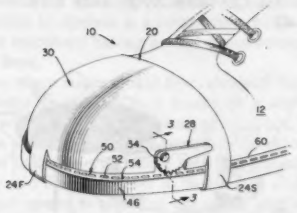


1. A buckle for closing a pair of opposed closure flaps of an athletic boot comprising:
an elongated catch adapted to be mounted to one of said closure flaps, said catch having a plurality of longitudinally spaced transverse notches formed therein;
a support adapted to be mounted opposite to said catch on the other of said closure flaps;
an elongated latch having a pair of parallel legs pivotally mounted to said support for rotation towards and away from said catch;
a substantially U-shaped wireform dimensioned to engage one of said notches;
means mounting said wireform to said latch for rotation towards and away from said closure flaps, said mounting means including a member having a threaded shaft pivotally mounted between the arms of said latch, and a wireform holder threaded on said shaft, the free ends of said U-shaped wireform being mounted to said wireform holder for rotation towards and away from said flaps; and
biasing means arranged between said member and said latch for urging said shaft and wireform holder towards said closure flaps.

4,051,612
SAFETY TOE SHIELD

Wilbur T. Damron, 4502 Lela Ave., NE., Roanoke, Va. 24019

Filed Dec. 17, 1976, Ser. No. 751,752
Int. Cl.[2] A43B *13/22*
U.S. Cl. 36—72 R 15 Claims

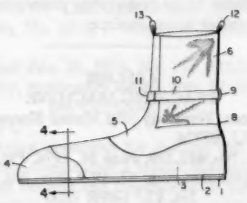


1. A safety toe shield for use on a shoe comprising:
a body having a lower marginal edge and adapted to be placed over and over the toe of a shoe;
a plurality of jaws depending from said body and each having a shoulder thereon which will engage the bottom of the sole of the shoe;
a plurality of quick-catches pivotally mounted on the body to engage the top of the shoe sole and force said shoulders into engagement with the shoe sole bottom; and
means on said quick-catches for locking said quick latches against the shoe sole to thereby lock said body onto said shoe without marring the shoe.

4,051,613
MARTIAL ARTS BOOT

Ronald Eugene Collins, 6001 Ruatan St., Berwyn Heights, Md. 20740

Filed Dec. 23, 1975, Ser. No. 643,912
Int. Cl.[2] A43B *5/00, 19/00*
U.S. Cl. 36—114 1 Claim



1. A martial arts boot comprising inner and outer soft rubber soles, a vamp being attached to said soles, a padding totally

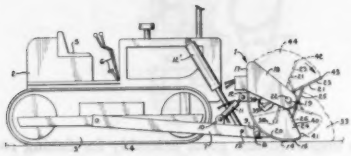
covering the inner surface of said vamp, a boot upper being attached to said vamp, said padding extending upwardly from said vamp over the inner front and side portions of said upper, a cap padding covering only the sides and front of the toe portion of said vamp and said upper having an elastic rear side portion.

4,051,614

HIGH CAPACITY LOADER BLADE

Richard E. Diggs, P.O. Box 776, S. 12A Road, Carthage, Mo. 64836

Filed Oct. 28, 1975, Ser. No. 626,448
Int. Cl.[2] E02F *3/82, 3/70*
U.S. Cl. 37—117.5 **6 Claims**



1. A boom mounted loader arrangement for excavator, said arrangement comprising:

a. a blade having a generally cylindrically shaped inner surface and a cutting edge; said inner surface having a central axis and being disposed at a radius therefrom; said blade being adapted for pivotal connection with said excavator;

b. a loading assembly rotatably connected with and supported by said blade for rotation about said central axis; said assembly including a generally flat plate disposed transversely within said blade, having first and second free edges extending generally 180° radially apart from said central axis, said first free edge being positioned outwardly of said central axis at a radius slightly less than the radius of said inner surface, whereby upon rotation of said plate relative to said blade, said first free edge sweeps said inner surface;

c. power means selectively pivoting said loading assembly with respect to said blade;

d. said second free edge being positioned outwardly of said central axis at a radius shorter than the radius of said first free edge; said second free edge being oriented toward and spaced apart from said inner surface during a ground scraping position, and defining a material receiving throat therebetween; and

e. said first free edge of said plate being disposed forwardly of said throat in said ground scraping position whereby ground engagement with said blade cutting edge loosens terrain material and urges the same through said throat and upon an upper surface of said plate, said plate at least partially supporting a load of said material thereon while additional loose material is supported on the inner surface of said blade.

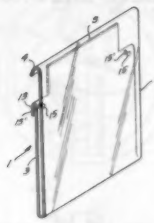
4,051,615

DISPLAY DEVICE AND ARRANGEMENT FOR NEWSPAPERS AND ANALOGOUS ARTICLES

Clarence Gosanko, 4551 51st Place, SW., Seattle, Wash. 98116, and Robert Weinberg, 6955 SW. Merry Lane, Beaverton, Oreg. 97005

Filed Feb. 13, 1976, Ser. No. 657,833
Int. Cl.[2] G09F *1/10*
U.S. Cl. 40—10 D **1 Claim**

1. A display device for displaying newspapers and analogous articles on a display rack, comprising an elongated folded element of resilient synthetic plastic material and having a generally rectangular transparent front panel, and a transparent rear panel having a generally rectangular central portion and side portions at opposite sides of the central portion, each side portion having an aperture, said panels being juxtaposed such that respective free portions of the panels form an open upper end at an upper region of the element for receiving an article to be displayed, and said panels being joined along a common unitary edge at a lower region of the element so as to form a closed lower end for holding the article intermediate said panels; means for closing the open upper end of the element, including a resilient, transversely-extending bent lip extending along a common unitary edge with said front panel so as to form therewith a groove for receiving free edge portions of said central portion of said rear panel with snap action to thereby press the article substantially flat for fixing the position of the article intermediate the panels and for imparting prominence to the article; and means on said rear panel in the



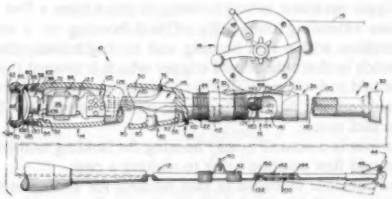
vicinity of said open upper end for mounting said element in upright position on a rack, including a pair of transversely-extending bent lugs each extending along a common unitary edge with a respective one of said side portions so as to form therewith an open-ended channel for receiving portions of the rack on which the element is to be supported, each bent lug having an aperture which is in alignment with a respective aperture of said side portions, and a pair of retaining inserts each having a threaded member and cooperating mating member which extend through the respective apertures which are in mutual alignment with each other, each of said members having an abutting portion at opposite sides of a respective channel and each extending transversely across the open end of said channel for retaining the element on the rack.

4,051,616

ROD WITH STRIKE SIGNALLING APPARATUS

William R. Mathauser, Box 1333, Sun Valley, Idaho 83353

Filed May 11, 1976, Ser. No. 685,157
Int. Cl.[2] A01K *97/12*
U.S. Cl. 43—17 **22 Claims**



1. A strike signalling means for use in fishing comprising:

a fishing rod having a fishing line and which flexes when a fish strikes a hook on said fishing line;

an electronic circuit mounted within said fishing rod to be protected from damage;

strike signalling means connected to said electronic circuit and controlled by said circuit to signal when a fish strikes said hook, said signalling means including a strain gage;

rod flexure sensing means attached to said rod and to said electronic circuit to complete said circuit so that said

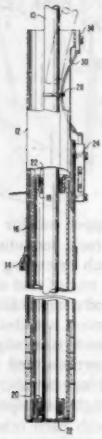
strike signalling means is connected by said electronic circuit to a power source to be activated to signal a strike when said rod undergoes a perdetermined amount of flexure due to said strike, said rod flexure sensing means being protected from environmental conditions which may cause said sensing means to inconsistently sense said rod flexure.

4,051,617

AUTOMATIC LINE RELEASE FOR SPIN FISHING EQUIPMENT

Thor Dorph, San Francisco, Calif., assignor to Bjorn Lie and Gina Lie, both of Oslo, Norway, part interest to each

Filed Sept. 16, 1976, Ser. No. 723,930
Int. Cl.² A01K *87/00*
U.S. Cl. 43—18 R **5 Claims**



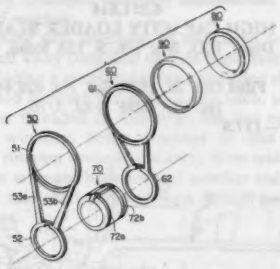
1. An automatic line release apparatus for casting with a spinning rod and reel comprising in combination:
- a spinning rod of resilient material;
- a hollow handle of substantially larger inside diameter than the diameter of the butt portion of said rod;
- means mounting said rod concentrically in said handle to permit flexure of said rod within said handle when casting;
- means for mounting a spinning reel on the exterior of said handle;
- a housing firmly attached to said handle on the opposite side of and forwardly of said reel;
- a trigger mounted in said housing to pivot from a first position extending outwardly of said housing to a second position within said housing and having a line receiving notch in that side of said trigger which is toward the butt of said rod when in said first position; so that line between said reel and the first line guide on the rod may be placed in said notch;
- cam means mounted in said housing for holding said trigger in said first position prior to making a cast;
- a bar member mounted in said housing for sliding mmovement parallel to the longitudinal axis of said rod, said bar member when moving from its forwardmost to its rearmost position engaging said cam member and moving it out of the path of travel of said trigger from its first to its second position;
- a saddle member having an opening therethrough and secured to said rod within said handle and spaced forwardly of said housing, said handle having an opening in the peripheral wall opposite said saddle member; and
- a resilient wire extending through the opening in said saddle member and having opposite ends attached to the forward ends of said handle and bar member.

4,051,618

LINE GUIDE ASSEMBLY FOR FISHING RODS

Ryuichi Ohmura, No. 19-3, Minami-cho, Shizuoka, Shizuoka, Japan

Filed June 24, 1976, Ser. No. 699,232
Int. Cl.² A01K *87/04*
U.S. Cl. 42—24 **10 Claims**



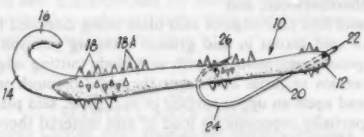
1. An improved line guide assembly for fishing rods comprising, in combination, a seat tube to be inserted over said fishing rods and made of an elastic material and a metallic frame made up of a pair of frame halves coupled to each other at their end surfaces each of which is an integral single body made by stamping of a metallic plate and includes a guide ring part for passing fishing lines therethrough, a seat ring part firmly inserted over said seat tube and an arm part for connecting said two ring parts, said seat tube being provided with a pair of annular grooves in the outer periphery thereof in which said seat ring parts of said frame halves are snugly received.

4,051,619

ARTIFICIAL FISHING LURE

Bingham A. McClellan, Traverse City, Mich., assignor to McClellan Industries, Inc., Traverse City, Mich.

Filed Sept. 27, 1976, Ser. No. 727,027
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.24 **9 Claims**



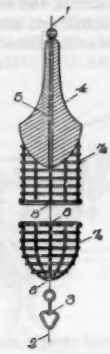
1. An artificial fishing lure comprising,
- an elongated worm-like body of soft elastic plastic having a head end and a tail end,
- a hook having a shank passed into the head end of the body and extending at an angle to the axis of the body to exit the body behind the head end,
- the eye of the hook being located adjacent the head end of the body and the rear end of the shank and leading part of the curve of the hook being located exteriorly of the body,
- the point end of the hook projecting forwardly through the body and projecting from the side thereof with the barb of the hook embedded in the body,
- and a multiplicity of thin integral spines on said body and projecting therefrom at least in the area surrounding said point of said hook with a spine in front of said point and projecting therebeyond.

4,051,620

FISHING DEVICE HAVING A FLOAT

Hiromi Yasuda, 3482, Maiokacho, Totsuka, Yokohama, Kanagawa, and Tokuichi Yasuda, 96, Aza-ohirama, Oazanada, Mugimachi, Kaibe, Tokushima, both of Japan

Filed Aug. 6, 1976, Ser. No. 712,341
Int. Cl.[2] A01K *97/02*
U.S. Cl. 43—44.99 **2 Claims**



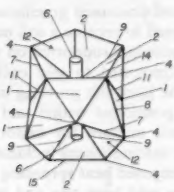
1. A fishing device which scatters baits at two distinctively different rates over a fishing site, the device comprising, in combinaton; a fishing line; a stopper on said line; a swivel element connected to one end of said line; a float positioned about said line and slidable along said line between said stopper and said swivel element; and an apertured basket for containing and scattering baits positioned about said line and slidable along said line, said basket including a lower part and an upper part separable therefrom, said upper part being fixedly connected to said float, being flotable therewith and having a substantially open downwardly facing end when separated from said lower part; whereby upon placing the device into water with baits in the basket, the float and the upper part rise along the fishing line to the surface of the water causing baits in said upper part to be immediately scattered over the fishing site from its substantially open end and the lower part to descend along the fishing line to the swivel element so as to discharge baits therefrom over the fishing site during a period of time.

4,051,621

HOMOHEDRAL MODULE GENUS EXTENDER

John Paul Hogan, 600 Elm St., Williamsburg, Iowa 52361

Filed Apr. 8, 1976, Ser. No. 674,935
The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.
Int. Cl.[2] A63H *33/10*
U.S. Cl. 46—26 **18 Claims**



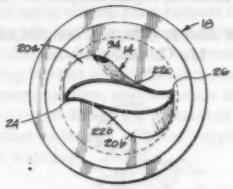
1. A toy block of convex-concave design in which the convex surface is identical to a surface on two joined, double truncated icosahedra, the truncations being formed by removal of a cluster of five icosahedral faces which form a pentangular pyramid about a vertex, said truncated icosahedra being joined along two truncation surfaces thus formed; and in which the concave surfaces are located at the remaining two truncation surfaces and are of such a degree of concavity that when a wholly convex surface surrounding a vertex on a similar block, an analogous icosahedron block or homohedral module, is fitted within it, a set of pentangular edges on each block are made tangent to one another.

4,051,622

FREE FLYING AERODYNAMIC TOY WITH HIGH STABILITY

Peter A. Sharp, 520 Utah St., San Francisco, Calif. 94110

Filed Apr. 12, 1976, Ser. No. 676,042
Int. Cl.[2] A63H *27/00*
U.S. Cl. 46—74 R **4 Claims**



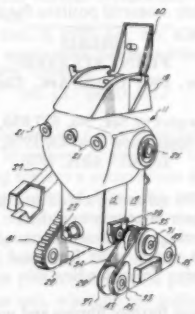
1. An aerodynamic toy comprising in a unitary assembly an elongate air foil having two substantially identical surfaces, each surface having a convex portion and a concave portion extending from the convex portion in a smooth discontinuity-free configuration, the convex portion of each said surface terminating in an edge coterminous with the extremity of the concave portion of the other said surface so that there are two edges diametrically spaced which define a chord therebetween, right and left hand circular stabilizing end plates mounted coaxially to respective ends of said elongate air foil, a rib midway between said end plates rigid with said air foil, said surfaces converging inwardly from respective said end plates to said rib so as to form an angle less than 180° between said surfaces on opposite sides of said rib, said chord is substantially constant throughout the length of said elongated air foil, said plates having equal diameters greater than said chord and defining substantially planar surfaces to avoid turbulence thereover so that said toy flies when thrown so as to spin in a direction wherein the convex portion of one surface rotationally leads the concave portion of the other surface.

4,051,623

MOBILE RECONFIGURABLE ROBOT TOY

Iwakichi Ogawa, Kashiwa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

Filed June 9, 1976, Ser. No. 694,316
Int. Cl.[2] A63H *11/10*
U.S. Cl. 46—103 **11 Claims**



1. A toy to which a plurality of pressfittable parts may be attached to form various configurations comprising:

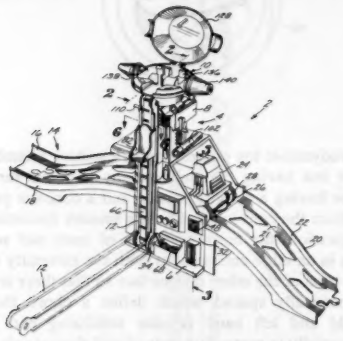
a body member having a plurality of openings therein;
a plurality of shafts, each one mounted for rotation in at least one of said plurality of openings;
means within said body member for driving each of said plurality shafts;
means attached to at least one of said shafts for removably press-fit connecting one of said press-fittable parts; and
first and second carriage members pivotally mounted to said body member, each said carriage member bearing means driven by at least one of said plurality of shafts for translating said body member.

4,051,624

CONTROL TOWER AND TRACK TOY ASSEMBLY

Iwakichi Ogawa, Kashiwa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

Filed June 9, 1976, Ser. No. 694,139
Int. Cl.[2] A63H *19/24*
U.S. Cl. 46—202 **27 Claims**



15. A combination toy assembly comprising:
a base member;
a toy vehicle capable of operative movement relative to and on the base member;
power means for energizing the toy vehicle;
means on the base member for restraining the forward locomotion of the vehicle and,
transmission means for coacting with the energized vehicle as a source of power to provide an energy output from the vehicle while restrained including a first input power connection means having a hollow crown gear for interfacing with the vehicle and a second output power connection means for providing output power including a power shaft movable along its longitudinal axis relative to the crown gear to vary its rotational direction, the power shaft further includes a pinion gear having a smaller width than the inside diameter of the crown gear so that the pinion gear will not be engaged when positioned within the crown gear to thereby provide a neutral position for the power shaft.

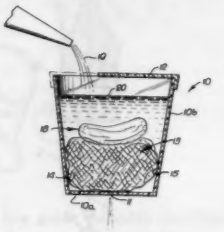
4,051,625

PLANT STARTER

George M. Sawyer, 8801 Calico Ave., Garden Grove, Calif. 92641

Continuation-in-part of Ser. No. 527,030, Nov. 25, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 657,927
Int. Cl.[2] A01C *1/00*
U.S. Cl. 47—14 **2 Claims**

1. In apparatus for sprouting a seed and in combination with said seed in the form of peanut in a shell,
a. a self supporting, preformed container having a lower portion and a water outlet from said lower portion, the container having an upstanding side wall which is transparent, and
b. a resiliently and flexibly fibrous and water retaining mass of permeable, deformable, and porous yarn material defining interstices, the material removably and loosely placed into and located in the container to extend substantially completely across the interior thereof, and supporting the seed abovesaid outlet and in intimate contact with said mass, whereby water received in the container will wet said material before slowly draining through said outlet and some of the water will be retained in the interstices of said material to maintain wet the supported surface of the seed whereby roots will penetrate said interstices to be wetted by water retained in said interstices and to be supported by said material, the seed located centrally of said mass of yarn material and centrally of the container, and the seed seated in a depression formed in said material,



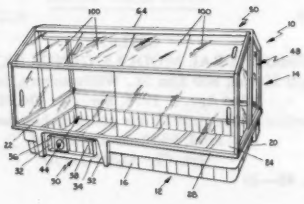
c. the container side wall closely surrounding the seed sidewardly thereof and extending above the level of the seed and material, the container formed by light passing transparent material, there being a removable cover on the container, the container having a bottom wall and said outlet being formed in said bottom wall, the transverse width of said bottom wall being approximately the same as the shell overall length, the seed extending lengthwise transversely of the container substantially parallel to the bottom wall.

4,051,626

PORTABLE GREENHOUSE

Richard L. Trumley, Charlotte, and Randy W. Linn, Eaton Rapids, both of Mich., assignors to General Aluminum Products, Incorporated, Charlotte, Mich.

Filed May 21, 1976, Ser. No. 688,823
Int. Cl.[2] A01G *9/14*
U.S. Cl. 47—17 **16 Claims**



1. A portable, self-contained greenhouse comprising:
a base pan adapted to receive a soil mixture;
a transparent enclosure supported on said base pan;
lighting means mounted to said enclosure for artificially stimulating the plant life growing in the soil mixture;
heating means positioned within said base pan and buried within the soil mixture for uniformly heating the soil mixture, said heating means including
a pair of superimposed heat spreading shields adapted to be placed within said base pan and buried within the soil mixture, said shields each having a plurality of spaced apertures arranged in vertically spaced pairs when said plates are superimposed;
a plurality of clips each extending through one of said pairs of vertically spaced apertures being generally U-shaped and including wire retaining tabs extending inwardly between the legs of the clip; and

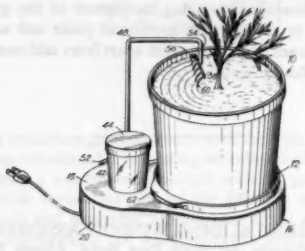
a resistance type heating wire sandwiched between said shields and retained by said tabs between the legs of each of said clips in a serpentine manner, said wire contacting said heat shields at spaced points.

4,051,627

DEVICE FOR ROTATING AND WATERING POTTED PLANTS

Robert G. Schilling, Jr., 36-21 193rd St., Flushing, N.Y. 11358

Filed Feb. 6, 1976, Ser. No. 655,685
Int. Cl.² A47G 7/02; A01G 27/00
U.S. Cl. 47—39 **9 Claims**



1. In a device for automatically caring for at least one potted plant, rotary support means for supporting a potted plant, moving means operatively connected with said rotary support means for turning the latter, container means for containing liquid to be supplied to the potted plant, said container means having a flexible wall portion, feed-tube means communicating with said container means and extending therefrom to the potted plant for feeding liquid from said container means to the potted plant when liquid is discharged out of said container means, and at least one cam carried by said support means for movement along a predetermined path during rotary movement of said support means, said container means being situated in said path, and said cam cooperating with said container means for compressing the same for discharging liquid out of said container means through said feed-tube means to a potted plant supported by said support means

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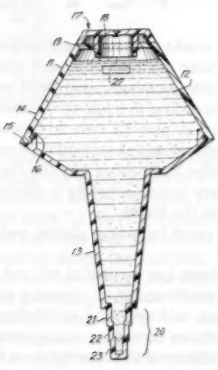
4,051,628

APPARATUS FOR THE IMPROVED DISPENSING OF PLANT NUTRIMENTS

Philip B. Knapp, Lynbrook, N.Y., and Harold Corey, Teaneck, N.J., assignors to Hortigro, Inc., Lynbrook, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,184
Int. Cl.² A01G 29/00
U.S. Cl. 47—48.5 **10 Claims**



1. Apparatus for transferring plant support reagents to a watered plant growing medium, such as soil, over a protracted period at an essentially constant rate which is a function essentially solely of the quantity of water added to such medium, comprising a container generally sealed throughout the protracted period and including a reservoir portion and an elongate probe portion adapted to be embedded in said growing medium, said probe portion being in communication with said reservoir portion, means in said probe portion for defining an aperture of a desired size larger than capillary size for communicating the interior of said probe to said growing medium, said probe and reservoir portions containing means for transferring plant support reagents to the watered plant growing medium and comprising an integral diffusion mass of stable, solid, water insoluble but permeable hydrophilic gel essentially saturated with a solution of water soluble plant support reagents wherein the concentration of plant support reagents within all areas of the gel system substantially equalizes between waterings, said aperture providing contact of said diffusion mass and the water of the plant growing medium, said container and said diffusion mass remaining integral during the protracted period whereby essentially constant quantities of plant support reagents are released at each watering.

4,051,629

HYBRID SEED PRODUCTION

Walton C. Galinat, Waben, Mass., assignor to Research Corporation, New York, N.Y.

Filed Apr. 12, 1976, Ser. No. 676,372
Int. Cl.² A01H 1/02
U.S. Cl. 47—58 **13 Claims**

1. A method for masking the expression of an undesirable recessive trait in the production of hybrid corn comprising the steps of:

selecting a corn which is homozygous for said trait;

incorporating into said corn a Tripsacum chromosome which has the dominant allele for said trait and which also has the capability of genetically interacting with said corn to produce, upon selfing, an endosperm phenotype sufficiently recognizable to determine whether said endosperm carries said chromosome; and

selfing said corn to increase said endosperm carrying said chromosome.

4,051,630

SOIL TREATMENT COMPOSITIONS

Richard Timothy Bishop, Durban, Natal, South Africa, assignor to Revertex (South Africa) (Proprietary) Limited, Jacobs, Natal, South Africa

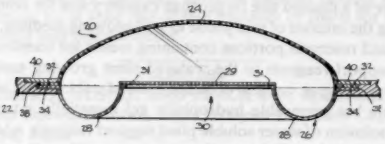
Filed Dec. 5, 1975, Ser. No. 638,166
Claims priority, application South Africa, Dec. 30, 1947, 74/8240; July 4, 1975, 75/4296
Int. Cl.² E02D 3/12
U.S. Cl. 47—58 **5 Claims**

1. A method of treating sand or soil having a particle size in the range of about 10 microns to about 700 microns, including the step of applying thereto a composition including a water-insoluble copolymer selected from the group consisting of vinylacetate/vinyl ester of versatic acid, vinylacetate/2-ethylhexylacrylate, vinly acetate/butyl acrylate, methyl methacrylate/2-ethylhexylacrylate, and styrene/2-ethylhexylacrylate in an amount to provide about 0.02 part of copolymer to 100 parts of sand or soil, whereby the individual particles or groups of particles of the sand or soil are rendered non-wetting and the particles retain the non-wetting properties even when they are not aggregated but are free flowing.

4,051,631
PLANTERS HAVING LIGHT-TRANSMITTING ENCLOSURES

John B. Jones, III, The Willows, Hardscable Road, North Salem, N.Y. 10560

Filed Sept. 15, 1976, Ser. No. 723,585
Int. Cl.[2] A01G 9/02
U.S. Cl. 47—69 15 Claims

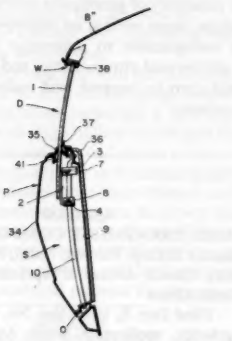


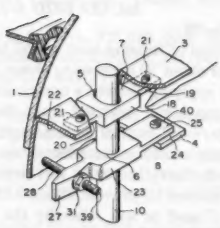
1. A planter comprising a dome-shaped portion which is at least in part light-transmitting a generally trough-shaped planting portion adapted to retain a planting medium therein below said dome-shaped portion, said planting portion having an inner and outer wall, said outer wall joined to said dome-shaped portion and at least a portion of which is substantially coextensive with the perimeter of said dome-shaped portion, there being an access opening defined by said inner wall of said planting portion, permitting access to both said dome-shaped and planting portions, and means for mounting said planter in a substantially horizontal position.

4,051,632
WINDOW GLASS MOUNTING MEANS FOR AUTOMOBILES

Ryoichi Fukumoto, Nagoya, and Toshiro Igarashi, Hoigun, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha and Toyota Shatai Kabushiki Kaisha, both of Kariya, Japan

Filed June 9, 1976, Ser. No. 694,446
Claims priority, application Japan, June 21, 1975, 50-76161
Int. Cl.[2] E05F 11/38
U.S. Cl. 49—348 8 Claims



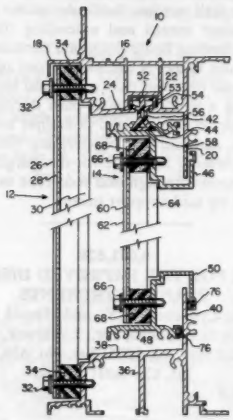


1. In an automobile including panel means which has at least one window opening, a window glass mounted in said panel means for movement substantially in vertical direction between a closed position wherein the window glass closes the window opening and an open position wherein the window opening is fully opened, and window glass actuating means for actuating the window glass to move it betweend said open and closed positions, the improvement comprising window glass mounting means including window glass support bracket means secured to the window glass, substantially vertically extending guide rail means stationarily disposed in said panel means, guide follower means slidably engaged with the guide rail means, means for connecting said guide follower means with said bracket means, said connecting means including pivot connection means at one point of said guide follower means for allowing a swinging movement of the guide follower means in substantially horizontal plane and adjustable connection means at another point apart from said one point of said guide follower means.

4,051,633
TOP HUNG SLIDING WINDOW ASSEMBLY

William P. Voegele, Jr., 8308 Post Road, Allison Park, Pa. 15101

Filed June 1, 1976, Ser. No. 691,825
Int. Cl.[2] E05D 13/02
U.S. Cl. 49—411 12 Claims



1. A sliding window assembly comprising:

A. a metal frame made up of a head member, a sill member and two side members, said head member including a channel extending therealong on the inside of the frame and defined in part by two downwardly sloping planar bottom surfaces which terminate in spaced apart relationship to define an opening into the channel;

B. a stationary panel including a glazing and secured to a first part of the frame;

C. a sliding panel including glazing and secured to a slider head; and

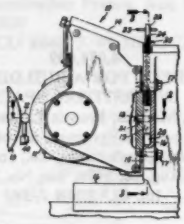
D. a rigid, plastic key secured at one end to a top of the slider head and positioned at an opposing end in the head member channel, said opposing end defined in part by sloping planar surfaces in mating engagement with the sloping bottom surfaces of the channel so as to permit the sliding panel to slidably move between the first part of the frame and a remaining part thereof.

4,051,634

REGULATING WHEEL PIVOT ADJUSTING DEVICE

Robert Clifford Fisher, Milford, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Feb. 6, 1976, Ser. No. 655,732
Int. Cl.[2] B24B 5/30
U.S. Cl. 51—103 R **3 Claims**



1. In a centerless grinding machine of the type having a base; a grinding wheelhead; a regulating wheelhead adapted to drive and support a workpiece in contact with the grinding wheel, and; a slide supporting one of the grinding and regulating wheelheads and moveable on said base along a feed axis for relative movement of the wheelheads in a grinding operation, wherein said regulating wheelhead is adapted to pivot about a joint so as to pivot said regulating wheelhead in a plane transverse to said feed axis; an improved pivot adjusting device comprising:

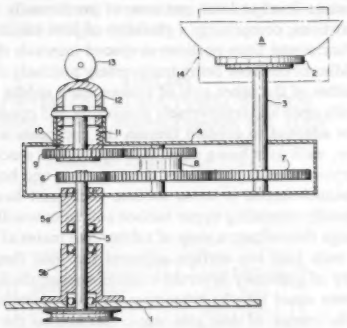
means to move said pivot joint along said transverse plane.

4,051,635

APPARATUS FOR FINISHING SHAPED ARTICLES

Gosta Arvid Valdemar Ohrn, Gemla, Sweden, assignor to AB Casco, Stockholm, Sweden

Filed June 25, 1976, Ser. No. 699,930
Claims priority, application Sweden, June 25, 1975, 7507292
Int. Cl.[2] B24B 5/04, 9/00
U.S. Cl. 51—108 R **7 Claims**



1. In the known apparatus for finishing shaped articles and the like which includes the combination of a working table, a finishing tool and movable mounting means for shaped articles associated with said table for moving a shaped article toward and away from said finishing tool, the improvement comprising a movable mounting means that includes

a. a pivoting arm, having an inner end and an outer end,

b. a driving shaft extending from the working table to the inner end of said pivoting arm

c. an article holding means supported on a rotary shaft, said rotary shaft extending from the outer end of said pivoting arm,

d. means for driving said driving shaft,

e. transmission means interconnecting said driving shaft and said rotary shaft,

f. braking means attached to the pivoting arm,

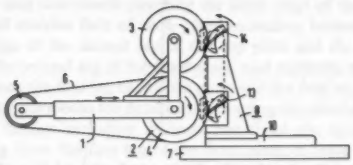
g. means for periodically moving said braking means into contact with said transmission means so as to induce a reactive force in the pivoting arm which will bring the article into contact with the finishing tool.

4,051,636

METHOD AND APPARATUS FOR GRINDING TURBINE AND COMPRESSOR BLADES TO DIMENSION

Karlheinz Heine, Wasel, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 19, 1976, Ser. No. 677,968
Claims priority, application Germany, Apr. 30, 1975, 2519190
Int. Cl.[2] B24B 21/16, 41/00
U.S. Cl. 51—145 R **5 Claims**



1. A method for grinding turbine and compressor blades to dimension comprising:

a. disposing, on a stationary base, a copier roller and grinding belt of equal diameter one above the other with their axes parallel;

b. supporting a model blade and a work piece blade in a work piece holder one above the other with their axes parallel to each other, said model blade and work piece blade being supported therein for simultaneous rotation about their axes;

c. supporting said work piece holder on an air cushion so that it is freely movable in any direction in the horizontal plane; and

d. bringing said model and work piece in contact with said copier roller and grinding belt.

3. Apparatus for grinding blades for turbines and compressors to dimension comprising:

a. A stationary tool holder;

b. a belt grinder rotatably disposed on said stationary tool holder;

c. a copier roller of the same diameter as said belt grinder rotatably disposed on said tool holder so as to be vertically spaced from said belt grinder with its axis parallel to the axis of said belt grinder;

d. a guide plate;

e. a work piece holder having a base plate disposed atop said guide plate, said work piece holder including means for supporting a model blade and a work piece such that they are simultaneously rotatable therein with their longitudinal axes parallel one on top of the other; and

f. means for establishing an air cushion between said guide plate and the base plate of said work piece holder whereby said work piece holder can be easily moved in any direction in the horizontal plane.

4,051,637

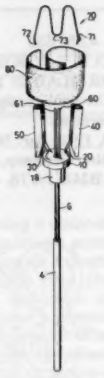
CYLINDER INTERNAL GRINDER

Norikazu Takeishi, 453, Nanjo, Nirayama-cho, Tagata, Shizuoka, Japan

Filed Mar. 16, 1977, Ser. No. 777,899
Int. Cl.[2] B24D 9/02
U.S. Cl. 51—364 **5 Claims**

1. A cylinder internal grinder comprising a shaft provided

with rotary force at one end thereof, a flexible wire secured to the other end of said shaft, a base secured to said flexible wire, a pair of holding elements erected centrally of said base in opposition to each other, spring means erected at the opposed edges of said base, pressing elements secured to the ends of said spring means and arranged parallel to the axis of said shaft, a



grinding member having its one end secured to said holding elements and arranged to wrap the pressing elements in the direction opposite to the direction of rotation of said shaft, and a substantially M-shaped spring having its pressing portions inserted in the insides of said pressing elements and having its fixing portion fixed to an external edge of said grinding member.

4,051,638

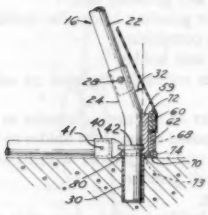
REMOVABLE ENCLOSURE FOR A SWIMMING POOL OR THE LIKE

Robert J. Heintz, 1828 Woodsboro, Royal Oak, Mich. 48067

Filed Aug. 5, 1976, Ser. No. 712,022

Int. Cl.[2] E04B *1/347*

U.S. Cl. 52—63 **2 Claims**



1. An enclosure for a swimming pool or the like, comprising a cover, a frame for supporting said cover, said frame having a plurality of laterally spaced elongated members anchored at their lower end portions to a base along the side of the enclosure, a baseboard extending along the side of the enclosure on the outer side of the lower end portions of said elongated members, and means anchoring said cover at the side of the enclosure comprising upper and lower gripping boards gripping an edge portion of said cover therebetween, said gripper boards being elongated members extending adjacent the outer side of said baseboard and having complementary tongue and groove formations along their adjacent edges gripping said edge portion of said cover, means securing said gripper boards together comprising assembled nuts and bolts, and fasteners passing through one of said gripper boards and passing through said baseboard and connected to the lower end portion of certain of said elongated members to secure the gripper boards and baseboard to said frame.

4,051,639

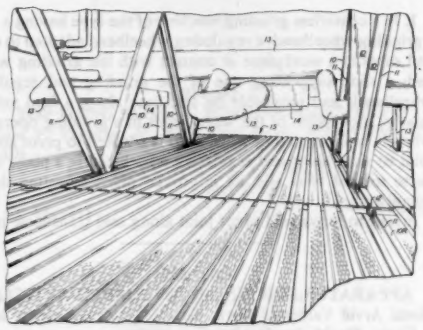
REMOVABLE DECK FOR A BUILDING STRUCTURE INTERSTITIAL SPACE

Jack P. Lombardi, Manlius; Francis T. Lombardi, and Tarky J. Lombardi, Jr., both of Syracuse, all of N.Y., assignors to Syracuse Tank & Manufacturing Co., Inc., Syracuse, N.Y.

Filed Aug. 26, 1976, Ser. No. 718,022

Int. Cl.[2] E04B *1/343*

U.S. Cl. 52—64 **3 Claims**



1. A removable deck for an interstitial space in a multi-storied building between the ceiling of one story and the floor of the story immediately thereabove, which space contains two spaced and parallel rows of building trusses, each row having at the same level at least one row of horizontally extending truss portions; comprising: a plurality of joist-saddles secured to the horizontal truss portions at spaced intervals therealong, the saddles of one row being transversely precisely opposite to the saddles of the other row of trusses, each saddle having an upwardly open and transversely projecting and opening socket position adapted to contain therein the end portion of a joist member, each joist being equal in length to the space between the horizontal truss portions of the two rows and being generally channel-shaped in cross section, each joist having a flat horizontally-extending upper surface and an upwardly projecting flange therealong, a strip of rubber-like material extending along each joist top surface adjacent the joist flange, and a plurality of generally inverted-channel-shaped deck members of chosen equal lengths extending across a plurality of joists from the center of one joist upper surface to the center of another joist upper surface, each deck member having an upper web surface slitted to provide air circulation therethrough and traction for workers walking thereon, each deck member having vertically extending side flange portions for resting on the joist top surfaces, each deck member having slots in the side flanges thereof extending from the side flange bottoms upward at least a distance equal to the distance that the upwardly projecting flanges of the joists extend above the rubber like strip on the joist top surfaces, whereby the joist ends may be dropped into the sockets of the saddles and lifted therefrom and the deck members placed across a plurality of joists with the slots of the deck side flanges fitted over the joist upwardly projecting flanges and lifted therefrom, while the saddles remain secured to the horizontal truss portions.

4,051,640

COMPOSITE STRUCTURES

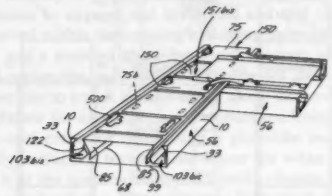
Rene F. Vincens, 92a Route de Geneve, 1028 Preverenge, Switzerland

Continuation-in-part of Ser. No. 589,880, June 21, 1975, abandoned, which is a continuation-in-part of Ser. No. 385,804, Aug. 6, 1973, abandoned. This application Jan. 26, 1976, Ser. No. 652,097

Claims priority, application France, Aug. 8, 1972, 72.28635; Jan. 26, 1973, 73.02920

Int. Cl.[2] E04B 5/48; H02G 3/00

U.S. Cl. 52—220 9 Claims



1. A composite structure, comprising:

a. an elongate supporting member having a generally U-shaped cross-sectional configuration, the arms of which provide two longitudinal flanks of said member and said U-shaped configuration providing a web between said arms, at least part of at least one of said flanks having at least one longitudinal recess of a generally C-shaped cross-sectional configuration; and

b. a plurality of bridge members disposed to stiffen the elongate supporting member, each bridge member comprising a rigid deck, at least two rigid piers, one at each end of said deck, and sharp-edged spur means on at least one of said piers engageable with the supporting member, said bridge members being spaced apart along the elongate supporting member, each bridge member having its deck extending between said flanks and spaced from said web;

at least one of said members being resilient to enable the bridge members to be clamped transversely in the supporting member with said spur means engaging said flanks, to resist any wrenching and longitudinal displacement of the bridge members.

4,051,641

PANELIZED STRUCTURAL SYSTEM

James I. Elliott, Arcadia Manor, Upperco, Md. 21155

Filed Aug. 9, 1973, Ser. No. 387,044

Int. Cl.[2] E04B 7/02, 1/30

U.S. Cl. 52—262 1 Claim

1. In a building having a roof, sidewalls including a plurality of pivotally insertable discrete panels, and foundation structure, the improvement comprising: a first plurality of said panels, each having parallel, rectangular-shape exterior and interior faces with a midbody therebetween having first and second lateral planar edge portions parallel-inclined in plan view at an angle to said exterior and interior faces, forming a parallelogram in shape, the exterior faces of all said panels having a lateral extension beyond the midbodies thereof with notch structure vertically along the edge of each lateral extension, the interior faces of all said panels having a lateral extension beyond the midbodies thereof, each of said lateral extensions respectively abutting a next adjacent panel and spacing apart all said midbodies on assembly, with the notch structure interfitting; means for fastening the first plurality of panels laterally together with the first lateral planar edge portion of one panel in complementary overlap with the second lateral planar edge portion of a panel next adjacent thereto, means for detachably securing each of the first plurality of panels to the building including: a plurality of cornerposts connecting the roof and the foundation, a top plate extending between the cornerposts at each side of the building, the top plate comprising an angle having perpendicular first and second planar legs, the first leg thereof extending outward and the second leg extending downward from the inner edge of the first leg, a floor plate parallel-spaced from the top plate along each side of the building, the floor plate comprising an angle having perpendicular first and second planar legs, the first leg thereof extending outward and the second leg extending upward from the inner edge of the first leg; on assembly, said exterior face of each panel extending upward covering the outer edge of the top plate and downward covering the outer edge of the floor plate, said interior face of each panel extending between the lower edge of the second leg of the top plate and the upper edge of the second leg of the floor plate, said midbody extending between the first leg of the top plate and the first leg of the floor plate; the means for detachably securing the panels to the building further including at least one fixed pin upwardly projecting from the first leg of the floor plate, at least one of said panel midbodies having a slot in the bottom edge thereof extending outwardly through a said lateral planar parallel-inclined edge in position for engaging said fixed pin and guiding said panel and securing the bottom thereof in place during assembly, means for detachably affixing each panel of said first plurality of panels to the top plate, and a second plurality of panels, each of said second plurality of panels having a first lateral edge with a portion substantially square in plan view for abutting a said cornerpost and a second lateral edge having struccomplementary to a lateral edge structure of a panel of the first plurality of panels.

4,051,642

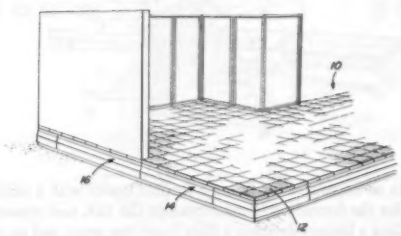
MODULE BUILDING FOUNDATION AND FLOOR SYSTEM

John H. Terry, 505 Park Terrace, Pine Bluff, Ark. 71601

Filed Sept. 30, 1975, Ser. No. 618,552

Int. Cl.[2] E02D 27/00; E04B 1/02

U.S. Cl. 52—293 13 Claims



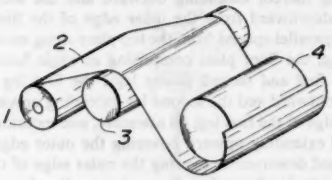
1. In a building construction, a foundation assembly comprising a precast ground bearing pad having a peripheral rim portion and upstanding ribs spaced inwardly therefrom, a separate wall section, locking means securing the wall section to said peripheral rim portion, a plurality of floor surface panels locked to the wall section in spaced relation to the ground bearing pad and spacer means engageable with the upstanding ribs of the ground bearing pad for supporting and holding said floor surface panels in abutting relation to each other spaced from the ground bearing pad.

4,051,643

METHOD OF PACKING ARTICLES WITH HEAT SHRINKABLE FILMS

Akio Saito, Tokorozawa, Japan, assignor to Showa Seitai Kogyo Kaisha Limited, Japan

Filed Oct. 12, 1976, Ser. No. 731,820
Claims priority, application Japan, Oct. 23, 1975, 50-126912
Int. Cl.² B65B 53/02
U.S. Cl. 53—30 S 5 Claims



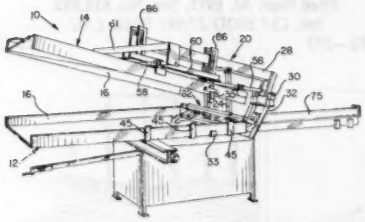
1. A method of packing an article with a heat shrinkable film comprising the steps of moving the heat shrinkable film, contacting the film against a heating member heated to a predetermined temperature sufficient to cause the film to shrink, and then immediately wrapping under a predetermined tension the heated film about an article to be packed having a width smaller than that of the heat shrinkable film with the side edges of the film protruded beyond the opposite ends of said article, and causing said film to shrink, thus tightly packing the article not only on the peripheral surface but also on the end surface of the article by the heat shrunk film.

4,051,644

APPARATUS FOR PRODUCING MATTRESSES

Richard H. Eide, Minneapolis, and Gerald A. Golembeck, Lake Elmo, both of Minn., assignors to The United States Bedding Company, St. Paul, Minn.

Filed Oct. 4, 1976, Ser. No. 729,386
Int. Cl.² B65B 63/02
U.S. Cl. 53—125 21 Claims



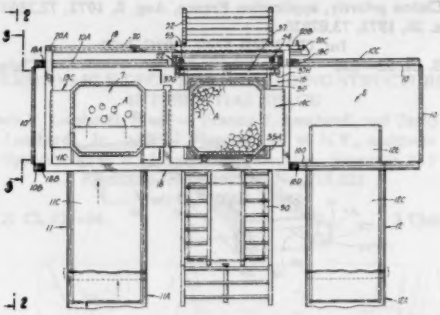
1. In an apparatus for filling a flexible cover with a resilient filler for the formation of mattresses or the like, said apparatus including a hopper defining a filler receiving space and an open end, said cover being dimensioned for attachment to the hopper whereby the interior of the cover communicates with said open end of the hopper, and means for driving said filler into said cover, the improvement comprising adhesive dispensing means positioned on said hopper, at least one surface of the filler being located adjacent said dispensing means when the filler is in the hopper, and means for operating said dispensing means during movement of the filler into the cover whereby adhesive is deposited on the filler surface for contact with an opposed cover surface whereby the cover is adhered to the filler.

4,051,645

COMESTIBLE PACKAGING APPARATUS

Aaron James Warkentin, 13551 View Drive, Orange Cove, Calif. 93636

Filed Oct. 26, 1976, Ser. No. 735,155
Int. Cl.² B65B 5/06
U.S. Cl. 53—248 4 Claims



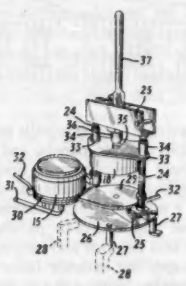
1. In a system of the character described for packaging comestibles in a container, the combination comprising a first comestible receiving station, a second comestible receiving station, a comestible loading zone between said receiving stations, a first and a second open-bottom cage, a horizonally movable carrier for shifting one of said cages from one of said stations to said loading zone and the other one of said cages from said loading zone to the other of said stations and vice versa, means at each of said station for loading comestibles into a corresponding one of said cages, said cages being porous and having an open bottom and each of said stations being underwater with said loading means functioning to introduce the comestibles into the water below a corresponding cage such that the comestibles may float upwardly into the cage, means at the loading zone for positioning a container below the expected arrival point of a comestible filled cage, means at said zone for elevating said container and said cage simultaneously out of the water such that the comestibles gravitate into the container, a container feed conveyor and a container discharge conveyor, said elevated means functioning to elevate the comestible filled container to an elevation which is substantially the same as the elevation of said feed and discharge conveyors.

4,051,646

MACHINE FOR SEALING PACKAGES

Mario Ursic, Rua Amador Bueno, 142 Sao Paulo, Brazil

Filed Feb. 4, 1976, Ser. No. 655,101
Int. Cl.² B65B 7/28, 67/00
U.S. Cl. 53—366 2 Claims



1. A machine for sealing packages, comprising:
a frame comprising a base, a pair of generally parallel columns extending upwardly from the base, and a member

spanning between the columns at a position along the columns remote from the base for maintaining the columns generally parallel;

a sealing assembly for sealing a package, said sealing assembly comprising an upper die, means mounting the upper die between said pair of columns for traveling along the length thereof, a hollow lower die having an opening extending theretherethrough in a direction along the extent of said columns for receiving a package to be sealed, means mounting said lower die to pivot between a position between said pair of columns and underneath said upper die, thereby to permit the upper die to travel down said columns to engage said lower die and seal the package received within the opening extending through said lower die, and a position away from said columns and clear of said upper die, and means operable for displacing said upper die to travel up and down along said columns; and

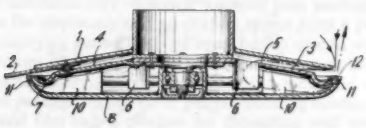
an extractor for extracting a sealed package from said lower die, said extractor comprising a plate-like member normally positioned beneath said lower die when said lower die is at the position away from said columns, said plate-like member being dimensioned to fit through the opening extending through said lower die, and means operable for raising said plate-like member to advance into the opening extending through said lower die thereby to extract a sealed package retained within said lower die.

4,051,647

ROTARY MOWER

Horst W. Geier, 18 Hawley Terrace, Yonkers, N.Y. 10606

Filed Jan. 21, 1976, Ser. No. 650,843
Int. Cl.[2] A01D *53/08*
U.S. Cl. 56—13.4 **4 Claims**



1. In a rotary mower, the combination comprising:

a mower body rotatable about a generally vertical axis, including a generally vertical cylinder in the center thereof,

a collar portion fixed to the bottom of said cylinder,

a blower disc mounted underneath the collar section at a predetermined distance therefrom to form an air intake gap and having a selected number of knife blades mounted thereto, said knife blades being rotatable about their mounting upon striking an object and said mountings being protected by the circular configuration of the housing formed between the collar section and the knife supporting blower disc, and,

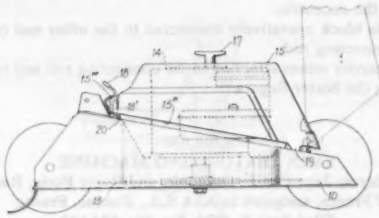
a freely rotatable protective saucer of a slightly larger diameter than the collar section and blower disc, said saucer being mounted to the mower cylinder at the lower end thereof, the rim of said saucer being substantially at the same level as the blower disc periphery and forming an annular exhaust gap with said disc of a smaller distance than the air intake gap to increase the exhaust air velocity in an upward direction forming a protective air stream about the mower.

4,051,648

ENGINE SHROUD FOR ROTARY LAWN MOWER

Charles E. Uhlinger, Des Moines, and Clair D. Splittstoesser, Ankeny, both of Iowa, assignors to AMF Incorporated, White Plains, N.Y.

Filed May 7, 1976, Ser. No. 684,387
Int. Cl.[2] A01D *55/18*
U.S. Cl. 56—255 **1 Claim**



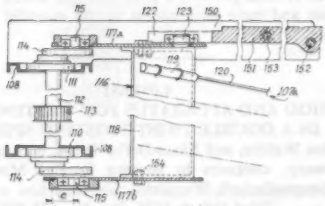
1. In a rotary mower having a deck, a grass catching blade below the deck, and power means on the deck for driving the blade, noise reduction means for said mower, said noise reduction means comprising a shroud over said power means, said shroud enclosing said power means except for a top air opening in the same and a marginal air opening about the same between the shroud and deck, said shroud being hinged at one end thereof on said deck, and latch means on said deck at the other end of said shroud to latch the same closed with respect to said power means, said power means comprising a gas engine, said top air opening being formed in said shroud opposite the air intake of said engine, said engine having an engine start pull cord handle, said handle being accessible through said top opening, and said engine having a below deck engine exhaust, said engine exhaust comprising an engine exhaust pipe, said pipe extending from said engine to below said deck, and an engine muffler on the outer terminal end of said pipe below said deck.

4,051,649

FRUIT HARVESTING MACHINE

Roger Clary, Loudun, France, assignor to Howard Machinery Limited, Bury St. Edmunds, England

Filed Oct. 7, 1975, Ser. No. 620,414
Claims priority, application France, Oct. 8, 1974, 74.33868; Aug. 25, 1975, 75.26175
Int. Cl.[2] A01D *46/00*
U.S. Cl. 56—330 **10 Claims**



1. A machine for gathering fruit from plants comprising, in combination:

a wheeled chassis;

a frame on said chassis;

a tunnel defined by the frame and extending longitudinally of the machine;

closure means mounted on the lower part of the frame and closing the base of the tunnel, the closure means being movable away from the longitudinal axis of the machine to allow the plants to pass through the tunnel;

at least one group of flexible beater fingers disposed at each side of the longitudinal axis of the machine; and

a drive assembly for driving each group of beater fingers in a generally elliptical movement, the drive assembly comprising,

drive means,

an eccentric driven by the drive means,

a connecting rod of which one end is operatively connected to the eccentric,

a slide block operatively connected to the other end of the connecting rod,

and carrier means attached to the connecting rod and carrying the beater fingers.

4,051,650

YARN TEXTURIZING MACHINE

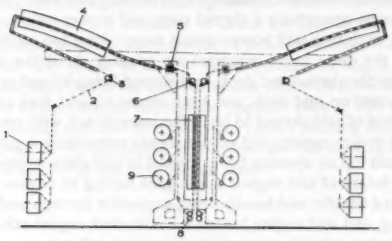
Jean Gleyze; Jean-Claude Dupeuble, and Roger Forin, Roanne, all of France, assignors to ASA S.A., Roanne, France

Filed June 8, 1976, Ser. No. 694,112

Claims priority, application France, June 17, 1975, 75.19497; Apr. 6, 1976, 76.10199

Int. Cl.[2] D02G *1/02*

U.S. Cl. 57—34 HS **8 Claims**



1. A yarn texturizing maching comprising a plurality of treatment positions, each said position comprising a substantially T-shaped framework, having a vertical portion and a horizontal portion; and, in operational sequence, a yarn supply device, a first yarn feeder, a yarn heating device, a cooling zone for the heated yarn, a false twist spindle, a second yarn feeder and a wind-up device, the false twist spindle, the second feeder and the wind-up device being mounted on the vertical portion of the T-shaped framework and the first feeder, the heating device and the cooling zone being on the horizontal portion, the yarn supply device being mounted at a location below the free end of the horizontal portion, effective to define with the vertical portion, a zone through which the operator can pass and have easy access to the essential parts of the machine.

4,051,651

METHOD AND APPARATUS FOR WETTING THREAD IN A DOUBLE TWIST TWISTING SPINDLE

Antonius Wahlen, and Klaus-Detlef Otten, both of Remscheid, Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Feb. 4, 1976, Ser. No. 655,282

Claims priority, application Germany, Feb. 8, 1975, 2505376; Dec. 23, 1975, 2558474

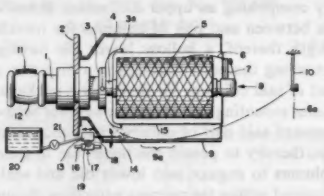
Int. Cl.[2] D01H *13/30*

U.S. Cl. 57—35 **29 Claims**

1. In the double twist twisting of a thread drawn from a delivery bobbin, passed through a hollow twist spindle and then directed outwardly into a balloon pattern, the improved method for wetting said thread with a liquid as a treating agent which comprises:

conducting the thread in contact with a balloon limiting guide surface as a wettable surface from which the liquid is applied to the thread being conducted in said balloon pattern; and

supplying said liquid in a discontinuous jet or spray under



regulated pressure impulses for application onto the wettable balloon limiting guide surface contacted by the thread and in a measured amount providing a predetermined liquid takeup by the thread.

4,051,652

METHOD AND APPARATUS FOR PACKAGING YARN PACKAGES DOFFED FROM A YARN PRODUCING MACHINE

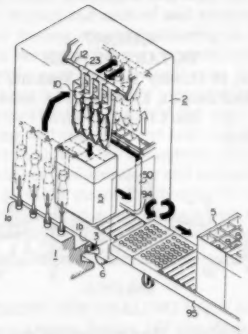
Satoru Hirano, Kyoto; Atsushi Kubota, Kobe; Mitsuru Yoshida, Kawanishi; Junzi Mizuno, Sabae, and Nobutaka Miyamoto, Sakai, all of Japan, assignors to Kanebo, Limited, Japan

Filed Feb. 7, 1977, Ser. No. 766,146

Claims priority, application Japan, Feb. 9, 1976, 51-13770; Feb. 9, 1976, 51-13771; Apr. 27, 1976, 51-48815; Apr. 30, 1976, 51-50159; May 25, 1976, 51-60991

Int. Cl.[2] D01H *9/00*

U.S. Cl. 57—52 **16 Claims**



1. Method for packaging in a carton full size yarn packages produced by a yarn producing machine provided with a plurality of yarn producing units, each unit provided with a spindle for supporting a bobbin for forming said yarn package, said spindles aligned along a longitudinal direction of said yarn producing machine, comprising in combination of doffing said full size yarn packages by means of a plurality of bobbin chucks:

a first step of positioning said carton at a predetermined position adjacent to a group of said spindles whereon full size yarn packages are supported;

a second step of simultaneously doffing a plurality of said full size yarn packages by said bobbin chucks from respective spindles of said group;

a third step of simultaneously displacing said doffed yarn packages supported by the respective bobbin chucks from the respective positions for carrying out said doffing operation to respective positions removed from said group of spindles;

a fourth step of simultaneously wrapping each of the doffed yarn packages supported by the corresponding bobbin

chuck with a film bag, while positioning said bobbin chucks at said removed positions;

a fifth step of displacing said bobbin chucks from said removed positions toward the respective releasing positions right above a receiving space in said carton and depositing said wrapped yarn packages into said carton;

an intermediate step of changing a pitch between two adjacent bobbin chucks of said group of bobbin chucks from a spindle pitch between two adjacent spindles of said spindle alignment to a predetermined distance selected for packaging, just before carrying out said fourth step operation or said fifth step operation;

a sixth step of releasing the grip of said bobbin chucks and displacing said bobbin chucks from said releasing positions upward to the respective standby positions of said bobbin chucks;

a seventh step of discharging said carton filled with said wrapped yarn packages from said predetermined position;

said operations from said first step to said seventh step are successively carried out until the doffing operation of full sized yarn packages is completely carried out with respect to all spindles of a spindle alignment of said yarn producing machine.

7. Apparatus for packaging in a carton full size yarn packages produced by a yarn producing machine provided with a plurality of yarn producing units, each unit provided with a spindle for supporting a bobbin for forming a yarn package, said spindles aligned along a longitudinal direction of said yarn producing machine, comprising in combination,

means for correctly positioning said apparatus at predetermined working positions for carrying out each doffing operation by said apparatus,

a group of bobbin chucks for doffing full size yarn packages from a group of said spindles facing said group of bobbin chucks respectively,

means for supporting said bobbin chucks in a condition whereat they are capable of changing a pitch between each two adjacent bobbin chucks of said group of bobbin chucks,

means for separately wrapping said full size yarn packages, each supported by a corresponding bobbin chuck, in individual film bags respectively,

means for temporarily positioning said carton at a position for simultaneously receiving wrapped yarn packages,

means for displacing said supporting means from a position for carrying out said doffing operation to several working positions of said apparatus, which involve a position for simultaneously, individually wrapping each said doffed yarn package supported by a corresponding bobbin chuck in said film bag, a position for depositing said wrapped yarn package in a predetermined space in said carton and a position for maintaining said bobbin chucks in a standby condition thereof,

said supporting means provided with means for changing a pitch between each two adjacent bobbin chucks from a spindle pitch of said spindle alignment to a pitch for packaging.

4,051,653

APPARATUS FOR SPINNING TEXTILE FIBERS

Anton Mitteregger, Linz, Austria, assignor to Dr. Ernst Fehrer Gesellschaft m.b.H. & Co., K.G. Textilmaschinenfabrik u. Stahlbau, Linz, Austria

Filed Jan. 7, 1977, Ser. No. 757,588

Claims priority, application Austria, Feb. 2, 1976, 714/76

Int. Cl.² D01H *1/12*

U.S. Cl. 57—58.89 **3 Claims**

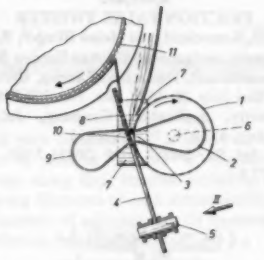
1. Apparatus for spinning textile fibers, which comprises

a suction drum having an air-permeable shell and rotatable about a first axis,

a rotary disc which is rotatable about a second axis, which crosses said first axis and is spaced therefrom by a distance which is equal to one to two diameters of said drum, said rotary disc having a generally flat side face that is almost tangential to said shell and defines a tapering gap therewith,

suction means disposed in said drum and defining on said shell an air-permeable suction zone which adjoins said tapering gap,

means for supplying flying fibers into said gap into contact with said suction zone and said side face,



drive means for rotating said drum and disc in such a manner that fibers in contact with said drum and disc are twisted to form a thread, and

thread-withdrawing means for withdrawing said thread in a direction which is approximately parallel to said first axis while holding said thread against rotation,

said drive means being operable to move said disc toward said thread-withdrawing means adjacent to said gap.

4,051,654

OPEN END SPINNING MACHINE

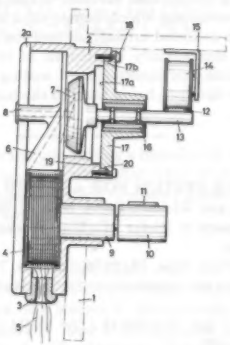
Gerhard Bartling, Burgstetten, Germany, assignor to SKF Kugellagerfabriken GmbH, Schweinfurt, Germany

Filed Aug. 27, 1976, Ser. No. 718,373

Claims priority, application Germany, Sept. 3, 1975, 2539088

Int. Cl.² D01H *1/12*

U.S. Cl. 57—58.89 **9 Claims**



1. An open end spinning machine comprising a frame, a plurality of spinning units disposed in side-by-side juxtaposition on said frame, each spinning unit comprising a housing and having at least a spinning rotor mounted at the end of a shaft jouralled in a shaft bearing, means for feeding fibers to said rotor, and means for withdrawing the yarn formed in said rotor, said machine having drive means for driving the shaft of each of the rotors in each of said spinning units and the guide means for mounting said drive means on said frame, said housing comprising a first portion accomodating said spinning rotor, and a second portion in which said bearing for said rotor shaft is fixedly mounted, said first and second housing portions being separably secured together and having cooperatively

engaging contact surfaces and counter-contact surfaces respectively permitting exchange of said rotor and rotor shaft and being effective to secure said second portion against axial and radial movement with respect to said first portion, said guide means being adjustable along the axis of said rotor shaft to permit engagement of said drive means and said rotor shaft irrespective of the shaft bearing employed.

4,051,655

FRICTION FALSE TWISTER

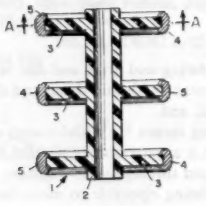
Hellmut Lorenz, Remscheid, and Heino Bünger, Radevormwald, both of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Remscheid-Lennep, Germany

Filed July 28, 1976, Ser. No. 709,319

Claims priority, application Germany, July 30, 1975, 7524158[U]; Aug. 8, 1975, 7525192[U]

Int. Cl.[2] D02G *1/04;* D01H *7/92*

U.S. Cl. 57—77.4 **34 Claims**



1. In a friction false twister for the false twist texturizing of a synthetic yarn in combination with yarn supply means and yarn take-up means, said twister including a plurality of parallel shafts, which are positioned on the corners of a polygon and rotatably driven in the same direction and at the same speed, and a plurality of discs with frictional surfaces on their peripheries, said discs being carried on each shaft in axially spaced positions and being so large in diameter that the discs on each of the parallel shafts overlap in the center of said polygon, the yarn path being substantially parallel to said shafts in frictional engagement with said disc surfaces in said center of the polygon, the improvement which comprises a sleeve hub which is adapted to be mounted on each of said rotatable shafts and to extend over substantially the length of said shaft, said hub having a plurality of axially spaced seatings for carrying said discs, each of the discs being fixed to the hub by a shrink fit on said seatings.

4,051,656

DRIVE SYSTEM FOR A SPINDLE FRAME

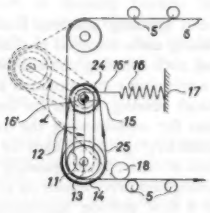
Heinz Burri, and Richard Burri, both of Winterthur, Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Sept. 10, 1976, Ser. No. 722,094

Claims priority, application Switzerland, Sept. 12, 1975, 11870/75

Int. Cl.[2] D01H *1/24;* F16H *7/10*

U.S. Cl. 57—105 **12 Claims**



1. A drive system for a spindle frame of a spinning machine having a plurality of spindles arranged in a row, said drive system comprising

a drive roll,

a tensioning roll,

a tangential drive belt tensioned between said drive roll and said tensioning roll for engaging and driving the spindles,

a first axle secured to said tensioning roll for rotation therewith about a first axis,

a second axle rotatably mounted about a fixed second axis,

a lever journalled on said first axle and said second axle,

means secured to said lever for biasing said lever to pivot about said second axis in a plane parallel to said tangential drive belt,

drive transmitting means disposed between said first and second axles for rotating said second axle off said first axle, and

a drive means interconnected to said second axle for driving additional working elements of the spinning machine.

4,051,657

SPINNING-RING BEARING AND SUPPORT

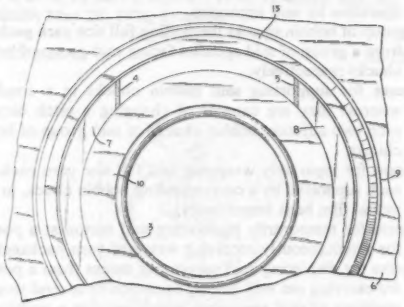
Alfons Spies, Munich, Germany, assignor to Dr. Johannes Heidenhain, GmbH, Traunreut, Germany

Filed July 24, 1975, Ser. No. 598,791

Claims priority, application Germany, July 25, 1974, 2435770

Int. Cl.[2] D01H *7/56, 7/64*

U.S. Cl. 57—124 **6 Claims**



6. In an aerodynamic bearing for air cushion supporting of a spinning or twisting ring, both axially and radially, comprising a stator, a rotor supported by and rotatable relative to said stator, the improvement comprising:

said rotor having an annular shape and including upper and lower radially extending projections;

said stator having an annular shape and being disposed concentric to said rotor and including upper and lower radially extending projections, whereby said stator substantially engages said rotor to define a small air gap therebetween for the air cushion;

mounting means for said stator comprising a resilient dampening absorber system including two resiliently flexible ring segments each having inside and outside radial surfaces and being oppositely disposed and substantially concentric relative to said stator, and connecting means operable to connect said stator to said ring segments to be supported thereby; whereby deflections of said stator result in corresponding deflections in said ring segments; and

stopping means disposed in close proximity to the outside radial surface of said ring segments when at rest,

said absorber system having a characteristic spring-curve which is linear for radial deflections until there occurs abutment between a portion of the outside radial surface of at least one of said ring segments with said stopping

means and thence rises progressively for larger deflections.

4,051,658

METHOD OF MANUFACTURING TWISTLESS YARN AND YARN MADE BY THIS METHOD

Thomas Henricus Marie Terwee, Enschede, and Jan Nijhuis, Hengelo, both of Netherlands, assignors to Hollandse Signaalapparaten B.V., Hengelo, Netherlands

Filed Jan. 16, 1976, Ser. No. 649,706

Claims priority, application Netherlands, Feb. 10, 1975, 7501535

Int. Cl.² D02G *3/40, 3/04*

U.S. Cl. 57—140 BY 8 Claims

1. Method for the manufacture of twistless or substantially twistless yarn from a sliver or a roving which consists of a fibrous material containing at least two components, at least one componeat being a potential adhesive, in which method the sliver or roving is subjected to a number of processes, including at least wet-drafting of the sliver or roving to a thinner fibrous sliver, false twisting, the supply of additional moisture and bonding of the fibrous sliver by activation of the potentially adhesive component, and drying of the fibrous sliver, wherein the step of activation of the potentially adhesive component comprises passing the fibrous sliver through a narrow space and heating the sliver therein, so that in said narrow space an equilibrium is reached between the amount of moisture in the fibrous sliver and in the narrow space surrounding the fibrous sliver at a temperature within the dissolving range of the potentially adhesive component, while maintaining a residual moisture content in the fibrous sliver sufficient for good activation.

8. Twistless or substantially twistless yarn manufactured by the application of the method as claimed in claim 1.

4,051,659

PRODUCTION OF CARBON FIBRE

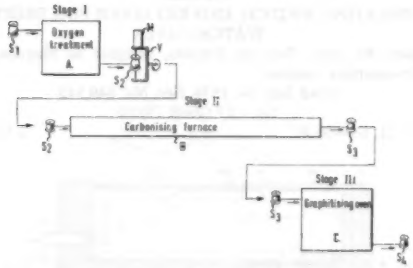
Harold Dennis Blakelock, South Ruislip, England, assignor to Morganite Modmor Limited, London, England

Filed Feb. 17, 1976, Ser. No. 658,368

Claims priority, application United Kingdom, Feb. 17, 1975, 6583/75

Int. Cl.² D01F *9/12, 9/14;* D02G *3/02*

U.S. Cl. 57—140 R 11 Claims



1. In the production of carbon fibre from a multifilament tow of organic precursor fibre, by heat treatment in an oxygen containing atmosphere and subsequent carbonisation optionally followed by graphitisation, the improvement comprising giving the tow a twist between the oxygen treatment and carbonisation, which twist is made permanent by the carbonisation and maintains the fibres within the tow during the carbonisation and subsequent handling.

6. A tow of carbon fibre, made by the method of claim 1, having a permanent twist maintaining the fibres within the tow.

4,051,660

YARNS AND THEIR METHOD OF MANUFACTURE

Ernest Griset, Jr., Asheville, N.C., assignor to Akzona Incorported, Asheville, N.C.

Continuation of Ser. No. 488,878, July 15, 1974, abandoned, and a continuation-in-part of Ser. No. 211,997, Dec. 27, 1971, Pat. No. 3,823,449. This application Aug. 24, 1976, Ser. No. 717,737

Int. Cl.² D01H *1/00, 7/92*

U.S. Cl. 57—140 BY 21 Claims

17. A novel yarn comprised of at least two strands of filaments twisted in random "*s*" and "*z*" directions in variant degrees of twist along their lengths, including sections of no twist, and having filaments of each strand simulaneously interlaced with filaments of adjacent strands to entrap the random twists in a cohesive. commingled yarn.

4,051,661

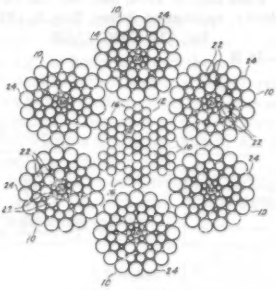
WIRE STRAND AND ROPE

Louis C. Leprohon, Jr., and John C. Overdurf, Jr., both of Williamsport, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Sept. 15, 1976, Ser. No. 723,366

Int. Cl.² D07B *1/06*

U.S. Cl. 57—148 20 Claims



1. A steel wire strand comprising a plurality of layers of steel wires helically wound around a steel king wire with all the wires in the layers made from a first steel grade and the king wire made from a second steel grade.

4,051,662

SOLID STATE WATCH WITH INERTIAL SWITCH

Arthur H. O'Connor, and Robert E. McCullough, both of Lancaster, Pa., assignors to Time Computer, Inc., Lancaster, Pa.

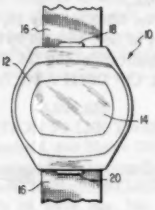
Division of Ser. No. 504,734, Sept. 10, 1974. This application Nov. 1, 1976, Ser. No. 737,654

Int. Cl.² G04B *19/24, 19/60*

U.S. Cl. 58—4 A 8 Claims

1. A solid state wristwatch comprising an electrooptical time display for displaying time in decimal numbers, an electrical power supply terminal for energizing said time display from a power supply, and an arm responsive inertial switch coupling said power supply terminal to said display whereby said display is energized upon a predetermined movement of a wearer's arm upon which said wristwatch is mounted, said arm responsive switch comprising an evelope, a pair of side-by-side electrical contacts in said envelope, a conductive member movable in said envelope into and out of bridging engagement with said contacts, and a time delay circuit coupled to said

contacts for producing an electrical output only when said member has made a complete cycle of movement between



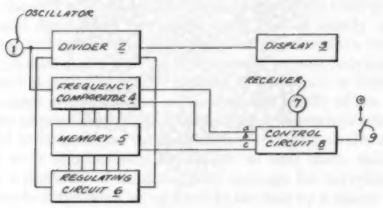
contacts bridging and non-bridging positions within a predetermined time period.

4,051,663

ELECTRONIC TIMEPIECE

Hiroyuki Chihara, Okaya, and Hitomi Numabe, Suwa, both of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Dec. 5, 1974, Ser. No. 529,881
Claims priority, application Japan, Dec. 5, 1973, 48-135301
Int. Cl.[2] G04C *13/08*
U.S. Cl. 58—26 R **10 Claims**



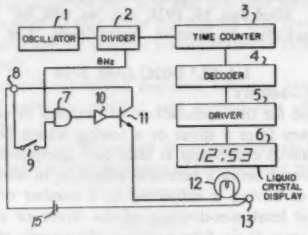
1. In an electronic timepiece having oscillator means for producing a high frequency time standard signal, divider means including a plurality of series-connected divider stages adapted in response to said time standard signal to produce a low frequency timekeeping signal, and display means for displaying time in response to said timekeeping signals, the improvement comprising receiving means adapted to receive an externally applied actual time reference signal for at least a predetermined actual time interval, comparator means coupled to said oscillator means and adapted to compare the period counted from said high frequency time standard signal during the predetermined actual time interval of said reference signal with the actual time interval of said externally applied reference signal received by said receiving means, and in response thereto produce a frequency difference signal representative of the difference between the high frequency time standard frequency required to produce the predetermined actual time interval and the high frequency time standard signal output of said oscillator means, memory means adapted to store said frequency difference signal, and division ratio regulating means coupled to said divider means for regulating the division ratio of said divider means to produce a timekeeping signal having a period representative of actual time in response to said frequency difference signal stored in said memory means being applied thereto.

4,051,664

DRIVE CIRCUIT OF LIGHT EMITTING MEANS FOR LIQUID CRYSTAL ELECTRONIC WATCH

Takehiro Ishikawa, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Aug. 31, 1976, Ser. No. 719,102
Claims priority, application Japan, Sept. 9, 1975, 50-109322
Int. Cl.[2] G04B *19/34*
U.S. Cl. 58—50 R **5 Claims**



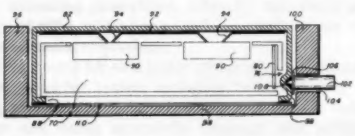
1. In a liquid crystal all electronic watch comprising an oscillating circuit, a frequency dividing circuit for dividing a signal obtained from said oscillating circuit, a time counter for counting an output signal of said frequency dividing circuit, a liquid crystal time display means, a decoder and driver for converting the time signals from said counter and displaying them by said liquid crystal display means, and a battery for supplying power for operating said electronic watch; auxiliary means for illuminating said liquid crystal time display means comprising means for generating an alternating current of selected frequency, light emitting means positioned for illuminating said liquid crystal time display means and control means for temporarily supplying alternating current from said generating means to said light emitting means only when it is desired to illuminate said crystal time display means, said alternating current generating means comprising an AND circuit having two inputs and one output, means for connecting one input of said AND circuit to an output of selected frequency of said frequency dividing circuit, means for connecting the other input of said AND circuit to terminal of said battery, and means for amplifying the current output of said AND circuit and applying the amplified output to said light emitting means.

4,051,665

OPERATING SWITCH AND RETAINER FOR DIGITAL WATCH CASES

Robert M. Arn, Toronto, Canada, assignor to Hayden/Arn Productions Limited

Filed Jan. 14, 1976, Ser. No. 649,143
Int. Cl.[2] G04B *19/30*
U.S. Cl. 58—50 R **3 Claims**



1. For an electronic digital watch having a watch case; at least one battery, an electronic operating and digital display module and an activator switch element associated with said display module contained in said watch case; and at least one activator post entending beyond the periphery of said watch case and into the interior thereof, and adapted to cause a closing action of said activator switch element so as to provide an electrical circuit through said element only when said activator post has at least a pre-determined force exerted axially therealong; the improvement where:

said watch case is substantially electrically non-conductive; and

said watch case further contains an electrically conductive retainer casing having a substantially planar bottom, said retainer casing being a pre-formed shell of elastomeric material, and being adapted to contact and to exert and maintain spring pressure against a first side of at least one battery remote from said digital display module;

said retainer casing having a side upstanding from said bottom and an inwardly turned lip to co-operate with said electronic and digital display module to secure the same therein; and being adapted to retain the inner end of said activator post out of a co-operating position with respect to said activator switch element which would result in said closing action of said switch element, except when at least a pre-determined force is extended axially along said activator post;

so that when at least said pre-determined force is exerted axially along said activator post, the inner end of said activator post is forced to act against the elastic memory of a portion of the side of said retainer casing shell so as to move it into contact with said activator switch element, so that an electrical circuit from said first side of said battery to said switch element is formed and includes said retainer casing shell; and when said axial force is released, the elastic memory of said portion of the side of said retainer casing shell causes said activator post to move away from said activator switch element.

4,051,666

ELECTRONIC TIMEPIECE HAND-ADJUSTMENT MECHANISM

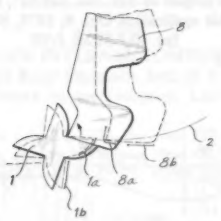
Masahito Yoshino, and Kazuo Kawasumi, both of Suwa, Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Nov. 20, 1975, Ser. No. 633,735

Claims priority, application Japan, Nov. 21, 1974, 49-140908[U]

Int. Cl.² G04B *27/00*; G04C *3/00*

U.S. Cl. 58—85.5 **10 Claims**



1. In a hand display electronic timepiece having a gear mechanically coupled to at least a second hand, the rotational position of the gear determining the time indication position of said hand and electro-mechanical converter means including a rotor mechanically coupled to said gear to rotate said gear, the improvement comprising manually operable adjusting means mechanically coupled to said gear, said adjusting means effecting an advancing of said gear and rotor to predetermined respective positions corresponding to $10n$ second positions of said second hand, where $n=1,2,3$, said adjusting means being adapted to effect an advancing of the second hand from substantially all positions of said second hand between said $10n$ second positions to the next $10n$ second position.

4,051,667

CHAIN WELDING MACHINE

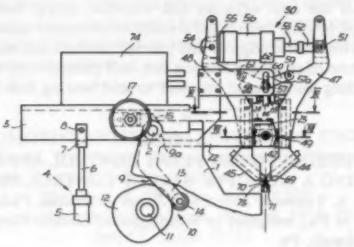
Gerhard Lange, Reutlingen, Germany, assignor to Wafios, Maschinenfabrik, Wagner, Ficker & Schmid (GmbH & Co. KG), Reutlingen, Germany

Filed Mar. 11, 1976, Ser. No. 665,804

Claims priority, application Germany, Mar. 11, 1975, 2510420; Sept. 30, 1975, 2543552

Int. Cl.² B21L *3/02*

U.S. Cl. 59—31 **27 Claims**



1. A chain welding machine for the electrical resistance butt-welding of inter-linked chain links bent into approximate C-shape comprising:

a machine frame having a vertical median plane;

two bushings mounted to said machine frame along horizontal axes and symmetrically with respect to said median plane;

a trunnion disposed in each bushing;

means resiliently mounting each trunnion in its respective bushing along the horizontal axis thereof;

two pair of double-armed levers arranged symmetrically with respect to said median plane, the levers of each lever pair being rotatably mounted to a respective one of said trunnions for rotation in opposite directions about the axis of said respective trunnion; and

an electrode supported by each lever and arranged to grip a respective one of the two ends of the chain link to be welded in a plier-like manner.

4,051,668

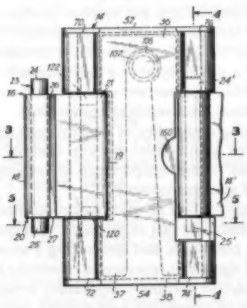
LINK CHAIN

Richard D. Learn, South River, N.J., assignor to Duchess Mfg. Corporation, Hoboken, N.J.

Filed Sept. 30, 1976, Ser. No. 728,141

Int. Cl.² F16G *13/18*

U.S. Cl. 59—80 **7 Claims**



1. A flexible articulated linkage comprising a plurality of link elements pivotably interconnected in a chain, at least, one of said link elements including a journal link-half and a bearing

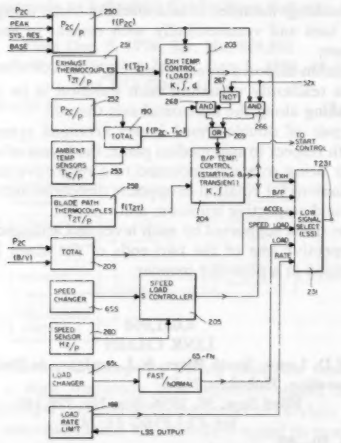
link-half, said journal link-half having a first and a second transverse edge, said journal link-half having a pintle mounted thereon transverse to the longitudinal axis of said chain and situated adjacent said first transverse edge, said pintle having two ends, said bearing link half having a third and a fourth transverse edge, a permanently closed bearing and a selectively openable bearing aligned therewith and spaced therefrom and situated adjacent said third transverse edge, said permanently closed bearing pivotably receiving endwise one end of the pintle of a next adjacent link element, said selectively openable bearing transversely releasably receiving the other end of said pintle of the next adjacent link element, means biasing said openable bearing to a closed condition and means adjacent said second transverse edge of said journal link-half and said fourth transverse edge of said bearing link-half permanently hingedly connecting said journal link-half to said bearing link-half.

4,051,669

GAS TURBINE POWER PLANT CONTROL APPARATUS HAVING A MULTIPLE BACKUP CONTROL SYSTEM

Robert A. Yannone, Aldan, and James J. Shields, Philadelphia, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 371,625, June 20, 1973, Pat. No. 3,911,285. This application Dec. 3, 1974, Ser. No. 529,204
Int. Cl.[2] F02C 9/08
U.S. Cl. 60—39.03 **40 Claims**



37. A method of operating a gas turbine electric power plant, said plant comprising a gas turbine having compressor, combustion and turbine elements, a generator coupled to said gas turbine for drive power, a generator breaker for coupling the generator to a power system, a fuel system for supplying fuel to said gas turbine combustion element, and means for operating said fuel system, said method comprising:

a. generating a plurality of control path signals, including at least two temperature backup control signals which are functions of the temperature at respective different portions of said gas turbine;

b. generating a first of said backup control signals to represent a relatively fast response of its respective temperature turbine condition, and generating a second of said backup control signals to represent a relatively slower response of its respective turbine temperature condition;

c. the step of generating said control path signals including, for each of said backup control signals, generating a setpoint signal, and generating said backup signals independently and as a function of their respective setpoint signals during a first predetermined portion of said turbine operation, and as a function of a common one of said setpoint signals during a second predetermined portion of said turbine operation; and

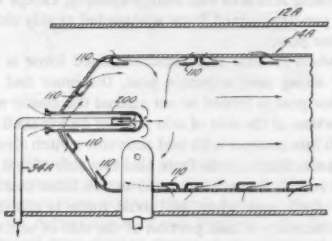
d. selecting one of said control signals and operating said fuel system in response thereto.

4,051,670

SUCTION VENT AT RECIRCULATION ZONE OF COMBUSTOR

Robert M. Pierce, Tequesta, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 30, 1975, Ser. No. 582,538
Int. Cl.[2] F02K 3/00, 3/10
U.S. Cl. 60—39.72 R **9 Claims**



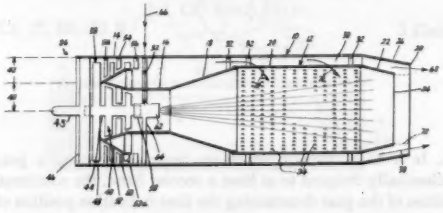
1. In combination in a gas turbine engine, a combustion section including a burner means, means for forming a region of recirculating fuel/air mixture in said burner means having a flow pattern suitable for combustion, means for reducing the pressure within the recirculating region for strengthening and stabilizing the recirculating flow pattern, said pressure reducing means including a vent conduit means, said vent conduit means having one end located at the recirculating region and the other end connected to a region of lower pressure for removing flow from said recirculating region, said vent conduit including a probe which extends into the recirculating region to withdraw gases therefrom.

4,051,671

JET ENGINE WITH COMPRESSOR DRIVEN BY A RAM AIR TURBINE

John A. Brewer, 2120 Kensington Blvd., Fort Wayne, Ind. 46805

Continuation-in-part of Ser. No. 519,527, Oct. 31, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,846
Int. Cl.[2] F02K 3/00
U.S. Cl. 60—262 **8 Claims**



1. In a jet engine comprising:

a. an elongated annular outer casing having a central longitudinal axis, a substantially open forward end and a substantially open, rear nozzle end,

b. an elongated annular inner casing coaxially disposed within said outer casing and having a substantially open forward end and a substantially, rear nozzle end,

1. said inner casing forward end being smaller than said outer casing forward end and forming a first air intake for said inner casing;

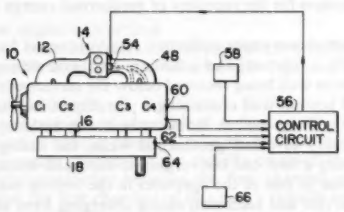
c. said outer casing being radially spaced from and defining an elongated annular air passage with said inner casing which extends between said ends thereof,
1. said inner casing forward end forming with said outer casing a second, annular air intake for said air passage,
2. said outer casing nozzle end being larger than and spaced rearwardly from said inner casing nozzle end whereby combustion gasses exhausted from said inner casing nozzle end cause rearward air flow in said air passage by Venturi action;
d. a fan and compressor assembly rotatable about said axis and having radially inner compressor vanes connected to radially outer motor fan vanes, and rotated thereby,
1. at least one group of said fan vanes being disposed in said second air intake whereby said air flow in said air passage causes rotation of said fan and compressor vanes,
2. at least one group of said compressor vanes being disposed in said first air intake whereby rotation of said compressor vanes forces air under pressure rearwardly through said inner casing; and
e. means for burning fuel disposed in said inner casing rearwardly of said compressor vanes;
the improvement wherein:
i. said inner casing has a first section which converges rearwardly from said first air intake to a rear end smaller than said first air intake;
ii. said inner casing has a second section with a forward end connected to said first section, said second section extending rearwardly from said first section to a rear end which is no larger than said forward end,
1. said fuel burning means being disposed in said second section;
iii. said inner casing has a rear section with a forward end connected to said second section, said rear section extending rearwardly from said second section to said nozzle end thereof
iv. said fan and compressor assembly includes an annular wall rotatable therewith and which diverges rearwardly in said annular passage from said second air intake to define a rearwardly converging air intake duct with said outer casing,
1. all of said fan vanes being connected to said wall and extending radially outwardly therefrom,
2. said one group of compressor vanes having a connection with said wall and extending radially inwardly therefrom.

4,051,672

MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

Kenji Masaki, and Kenji Okamura, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed July 22, 1975, Ser. No. 598,075
Claims priority, application Japan, Sept. 20, 1974, 49-109185
Int. Cl.[2] F02B *75/10*; F01N *3/10*
U.S. Cl. 60—277 **14 Claims**



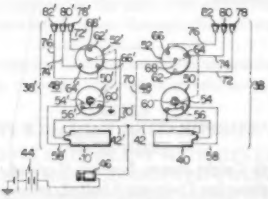
1. A multi-cylinder internal combustion engine having a first group of cylinders and a second group of cylinders, the engine being followed by an after-burner to purifying exhaust gases discharged from the first and second groups of cylinders, said engine comprising:
a carburetor for supplying into the first and second groups of cylinders a first air-fuel mixture whoch is leaner than the stoichiometric air fuel mixture;
a mixture enriching device arranged to supply supplemental fuel from the fuel chamber of said carburetor into portions upstream of the intake ports of said second group of cylinders to enrich the first air-fuel mixture into a second air-fuel mixture which is richer than the stoichiometric air-fuel mixture; and
control means to cause said mixture enriching device to stop supply of the supplemental fuel during at least one of high engine speed, high engine load, and excessively high afterburner temperature.

4,051,673

AUTOMOTIVE INTERNAL COMBUSTION ENGINE

Kenji Masaki, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sept. 4, 1975, Ser. No. 610,390
Claims priority, application Japan, Sept. 19, 1974, 49-108081
Int. Cl.[2] F02B *75/10*
U.S. Cl. 60—282 **14 Claims**



1. A spark-ignition multiple-cylinder internal combustion engine having a first set of cylinders connected to first mixture induction means operative to supply each of said first set of cylinders with a combustible mixture leaner than a stoichiometric mixture, a second set of cylinders connected to second mixture induction means operative to supply each of said second set of cylinders with a combustible mixture richer than the stoichiometric mixture, an exhaust system including exhaust re-combustion means for re-combusting the mixture of the exhaust gases from the first and second sets of cylinders, and a spark-ignition system comprising first and second ignition units respectively connected with said first and second sets of cylinders, wherein the first ignition unit is arranged to provide spark-advance characteristics enabling each of the first set of cylinders to produce a power output approximating maximum power output of the cylinder and the second ignition unit is arranged to provide spark-advance characteristics producing ignition timing retarded from ignition timing dictated by spark-advance characteristics which will provide maximum power output of each of the second set of cylinders.

4,051,674

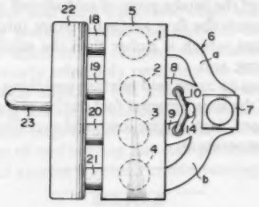
MULTICYLINDER INTERNAL COMBUSTION ENGINE

Motoo Suzuki, Kyoto, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Mar. 9, 1976, Ser. No. 665,258
Claims priority, application Japan, Mar. 20, 1975, 50-34768
Int. Cl.[2] F02B *75/10*
U.S. Cl. 60—282 **14 Claims**

1. A multicylinder internal combustion engine comprising: a plurality of cylinders; means for making an air-fuel rich mixture to be supplied to said cylinders; first passages for supplying the rich mixture made by said making means to some of said cylinders; second passages for supplying the rich mixture to the remaining ones of said cylinders; an air-supply passage having one end opening in said second passages and the other

end communicating with the atmosphere; and valve means disposed in said air-supply passage operative to close the passage under high load conditions so that the rich mixture is supplied to all the cylinders under high load conditions, and, under other operating conditions, the rich mixture is supplied only to the cylinders communicating with the first passages



while a lean mixture comprised of air introduced through the air-supply passage mixed with the rich mixture is supplied to the other cylinders comunicating with the second passages.

10. A multicylinder internal combustion engine as claimed in claim **1**, further including means for decontaminating exhaust emissions from all the cylinders by oxidizing HC and CO contained therein.

4,051,675

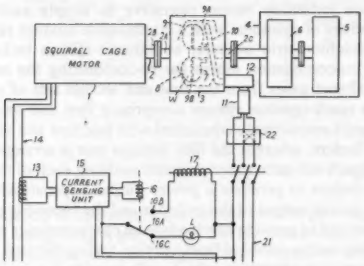
DRIVES INCORPORATING VARIABLE FILLING FLUID COUPLINGS

Walter Hugh Knight James, London, England, assignor to Fluidrive Engineering Company Limited, Isleworth, England

Continuation-in-part of Ser. No. 495,463, Aug. 7, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,376

Int. Cl.[2] F16D *33/00*

U.S. Cl. 60—330 **4 Claims**



1. In a fluid coupling assembly comprising a variable filling fluid coupling, adjustable filling control means for controlling the degree of filling of the coupling by removing excess liquid therefrom, said filling control means providing the sole means of escape for liquid from the coupling under running conditions, torque-sensing means for sensing the driving torque of the fluid coupling, and controller means under the control of the torque-sensing means for (1) moving the filling control means to increase the filling of the coupling when the sensed torque falls below a predetermined value and (2) stopping the filling control means when the sensed torque exceeds said predetermined value to hold the degree of filling of said coupling constant until said sensed torque falls below said predetermined value, whereupon said torque sensing means operates said filling control means to allow the degree of filling of said coupling to increase.

4,051,676

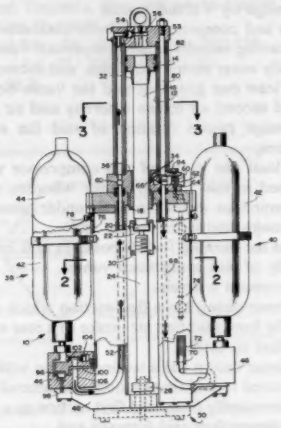
HYDRAULIC VALVE ACTUATOR

Howard L. Ledeen, Pasadena; Franz Schmon, Granada Hills, and Willem E. Tupker, Sylmar, all of Calif., assignors to Ledeen Flow Control Systems, Inc., Sun Valley, Calif.

Filed Mar. 25, 1976, Ser. No. 670,254

Int. Cl.[2] F15B *1/02, 20/00*

U.S. Cl. 60—404 **8 Claims**



1. An emergency valve actuator comprising:

a cylinder;

a piston reciprocable in said cylinder;

a pair of pressure fluid sources;

separate pressure ducts connecting said sources to inlet ports in said cylinder on one side of said piston;

separate exhaust ducts connecting outlet ports in said cylinder on the other side of said piston to an evacuation zone;

first check valve means in said inlet ports and pilot-operated check valves in said outlet ports, all blocking outward flow therethrough;

each of said pilot-operated check valves being exposed to fluid in one of said pressure ducts and being operative in response to flow therethrough to move to open position; and

selectively operable valve means connected into each of said pressure ducts.

4,051,677

MULTIPLE-COMPLETION GEOTHERMAL ENERGY PRODUCTION SYSTEMS

Allen T. Van Huisen, 29456 Indian Valley Road, Rolling Hills Estates, Calif. 90274

Division of Ser. No. 375,751, July 2, 1973. This application Oct. 3, 1974, Ser. No. 511,586

Int. Cl.[2] F03G *7/00*

U.S. Cl. 60—641 **17 Claims**

1. A system for the recovery of geothermal energy comprising:

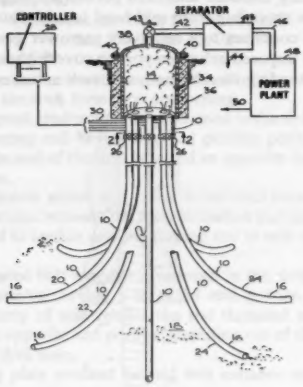
a closed, steam vapor collection reservoir vessel having side walls, a top wall and a bottom wall, said side walls and bottom wall being recessed below the surface of the earth, said bottom wall containing a plurality of inlet apertures, and said top wall including at least one outlet aperture;

a plurality of cased geothermal wells, the casing of each having a first end converging toward and sealingly connected to one of the apertures in the bottom wall of said reservoir and each well casing diverging from said reservoir and having a second end disposed within a common, wet geothermal zone having a temperature of at least 300° F;

vapor fluid delivery means within each of said wells to

conduct heated steam vapor fluid from each second end to said reservoir;

separation means for receiving the collected heated steam vapor from the outlet aperture; and



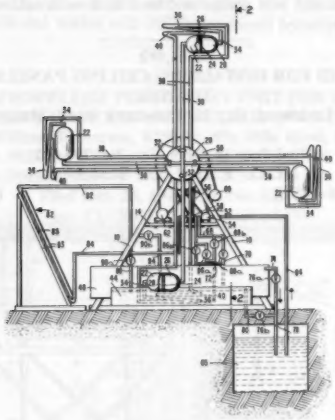
energy conversion means for receiving said separated heated fluid and for converting it into rotary power.

4,051,678

THERMAL PANEL POWERED HEAT ENGINE

John W. Yates, 6005 Sixth St., Tampa, Fla. 33611

Filed Mar. 12, 1975, Ser. No. 557,512
Int. Cl.[2] F03G *1/02, 7/06*
U.S. Cl. 60—641 **12 Claims**



1. A heat engine comprising:

a plurality of tanks, each tank having therein a flexible diaphragm dividing the tank interior into first and second chambers;

a rotatable structure;

means connecting said plurality of tanks to said rotatable structure in radially opposed pairs for rotation therewith;

first pipe means connecting the radially opposed tanks for fluid communication between the first chamber of each tank and the first chamber of that tank's radially opposed tank;

a plurality of evaporator coils, each evaporator coil having first and second open ends, one evaporator coil uniquely associated with each tank;

a plurality of condensor coils, each condensor coil having an open end and a closed end, one condensor coil uniquely associated with each tank;

second pipe means connecting each tank to its associated evaporator coil first open end for fluid communication between the second chamber of the tank and its associated evaporator coil and for rotation of said evaporator coils with said tanks as said rotatable structure rotates;

third pipe means coupling said evaporator coils and said condensor coils to connect the second open end of each evaporator coil to the open end of the condensor coil associated with the tank with which the evaporator coil is associated, for fluid communication between the commonly associated evaporator coil and condensor coil and for rotation of said condensor coils with said tanks as said rotatable structure rotates;

a fluid propellant within the first chambers of said tanks;

a high vapor pressure fluid within the second chambers of said tanks;

a hot water reservoir positioned adjacent the lower extremity of rotation of said evaporator coils for passage in turn therethrough of each evaporator coil as said rotatable structure rotates;

a cold water reservoir positioned for passage in turn therethrough of each condensor coil, as said rotatable structure rotates, with each condensor coil passing through the cold water reservoir as the evaporator coil associated with the tank radially opposed to the tank with which that condensor coil is associated passes through the hot water reservoir; and

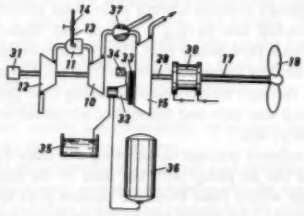
output means coupled to said rotatable structure for generating power in response to rotation of said rotatable structure.

4,051,679

MARINE PROPULSION PLANT WITH REVERSIBLE PROPELLER SHAFT CONNECTED THERETO

Lars Thorbjorn Collin, Molndal, Sweden, assignor to Lars Collin Consult AB, Vasterbergsgatan, Sweden

Continuation of Ser. No. 595,228, July 11, 1975, abandoned, which is a continuation of Ser. No. 422,845, Dec. 7, 1973, abandoned. This application Mar. 16, 1976, Ser. No. 667,341
Claims priority, application Sweden, Aug. 19, 1972, 7216003
Int. Cl.[2] B63H *23/08;* F01K *13/02*
U.S. Cl. 60—656 **2 Claims**

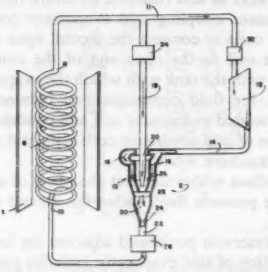


1. In a propulsion plant including a propulsion shaft, a gas turbine having a rotor and an output shaft, means for supplying motive fluid to the turbine, a reversing gear means for connecting the turbine output shaft to the propulsion shaft, said gears means including a first portion connected to said turbine output shaft and a second part connected to said propulsion shaft, clutch means to engage and, during reversing, disengage said first and second parts, the improvement of a combination pump/motor hydraulic machine operably connected to the turbine rotor, an open reservoir for hydraulic fluid and a closed storage tank for pressure fluid, means for engaging the machine as a pump to the turbine rotor for braking the rotor during reversing by transporting hydraulic fluid from said reservoir to said storage tank, and to act as a motor for subsequently accelerating the rotor, by accepting return flow of hydraulic fluid from said storage tank back to the reservoir.

4,051,680
MODIFIED RANKINE CYCLE ENGINE APPARATUS

Carroll D. Hall, Rte. 1 Box 5X, Talihina, Okla. 74571

Filed Dec. 26, 1973, Ser. No. 428,031
Int. Cl.[2] F01K *19/00*
U.S. Cl. 60—689 10 Claims



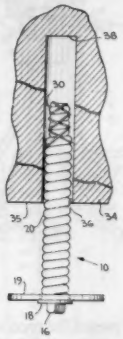
1. A modified Rankine cycle engine apparatus comprising
a heat reservoir,
a working fluid having a gaseous phase
a fluid heating vessel, which heating vessel is in thermal contact with the heat reservoir, the heating vessel having an inlet and an outlet, and which heating vessel contains a portion of the gaseous phase of the working fluid, which experiences heating while within the heating vessel,
a first conduit having a first end connected to the outlet and having a second end
an engine in which heated working fluid undergoes an approximately adiabatic expansion, thereby converting a portion of heat energy of the working fluid into mechanical work,
an engine intake conduit having a first end connected to the first conduit and having a second end connected to the engine, thereby connecting the engine to the outlet of the fluid heating vessel, through which conduits the heated working fluid passes to the engine,
a jet pump with a suction port, a main flow intake port and a main flow exhaust port,
an engine exhaust conduit connecting the engine to the suction port of the jet pump, through which conduit expanded, spent working fluid passes from the engine,
a pump intake conduit having a first end connected to the first conduit and having a second end connected to the pump main flow intake port, thereby connecting the outlet of the heating vessel to the main flow intake port of the jet pump, through which heated working fluid passes into the jet pump and into and through a nozzle structure within the pump, and
a pump exhaust conduit connecting the main flow exhaust port of the jet pump with the inlet of the heating vessel, through which fluid from the suction port and the main flow intake port passes out of the jet pump and returns to the heating vessel;
whereby, an adiabatic expansion engine, supplied with a heated, pressurized working fluid is exhausted by a jet pump, and spent working fluid is returned to a heating vessel for reheating.

4,051,681
UNITARY ROOF BOLT ASSEMBLY

Lee William Yaros, 136 Gedney Road, Trenton, N.J. 08638

Filed Oct. 6, 1975, Ser. No. 619,739
Int. Cl.[2] E21D *20/02*
U.S. Cl. 61—45 B 7 Claims

1. A unitary roof bolt assembly mountable within a bore hole of predetermined depth in an excavation roof desired to be strengthened comprising:
a bolt having an elongated stem, a head integral with said stem at one end thereof; and said stem having a distal end opposite said head and a length which is somewhat but not substantially less than the depth of said bore hole which reaches to an innermost wall thereof,
a rupturable flexible sack means having a first generally uniformly disposed unbroken portion encompassing said stem in extending from said head to said distal end, and which continues to a relatively narrower generally uniformly disposed unbroken portion covering said distal end and extending therebeyond, said sack means containing a

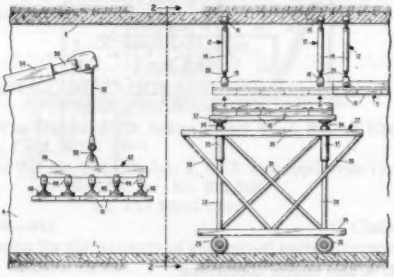


curable adhesive along said extents of said first and said second portions thereof, and being secured to said stem by means wrapped about said first and said second portions until ruptured,
whereby an insertion of said bolt within said bore hole which pressure contacts said second portion of said sack means against said innermost bore hole wall provides a substantial force rupturing said sack means so as to fixedly secure said bolt within said bore hole with said adhesive thus released therebetween.

4,051,682
METHOD FOR INSTALLING CEILING PANELS IN A TUNNEL

James L. Lockwood, Jr., 10 Tomahawk Road, Hampton, Va. 23669

Filed July 15, 1976, Ser. No. 705,612
Int. Cl.[2] E21D *11/05;* B25J *3/00*
U.S. Cl. 61—45 R 8 Claims



1. A method for installing ceiling panels in a tunnel comprising the steps of:
a. installing a plurality of depending brackets from the tunnel roof;
b. disposing a vertically movable horizontal platform at an intermediate height in the tunnel;
c. lifting a plurality of separate ceiling panels to said horizontal platform;
d. rigidly linking together said separate panels on said platform to form a single integrated ceiling section for subsequent handling as one unit;
e. raising said horizontal platform to a position adjacent said brackets; and
f. securing said ceiling section to said brackets.

4,051,683

METHOD AND APPARATUS FOR SUPPORTING A MINE ROOF

Stephen F. Koval, Portage, Pa., assignor to Jennmar Corporation, Cresson, Pa.

Filed June 28, 1976, Ser. No. 700,600
Int. Cl.[2] E21D *20/02*
U.S. Cl. 61—45 B 19 Claims

1. Apparatus for insertion in a drill hole of a rock formation to support the rock formation comprising,

an elongated reinforcing rod positioned in the drill hole, said reinforcing rod having one end portion positioned adjacent the end of the drill hole and an opposite threaded end portion,

a resin system mixed and cured in the drill hole and filling the annulus between the rock formation and said reinforcing rod to anchor said reinforcing rod to said rock formation,

an elongated bolt member positioned in the drill hole, said bolt member having a threaded end portion positioned oppositely of said reinforcing rod threaded end portion and an opposite end portion extending out of the entrance to the drill hole,

a bearing plate retained on said bolt member opposite end portion,

a coupling having an internally threaded bore for receiving said reinforcing rod threaded end portion and said bolt member threaded end portion,

stop means positioned in said coupling for maintaining said bolt member threaded end portion in a first position within said coupling spaced from said reinforcing rod threaded end portion to permit rotation of said bolt member and said reinforcing rod, and

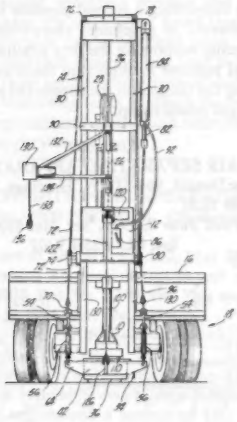
said bolt member operable upon rotation to shear said stop means and advance in said coupling to urge said bearing plate into engagement with the rock formation and apply tension on said bolt member with said reinforcing rod anchored within said drill hole.

4,051,684

SELF-PROPELLED PERCUSSION UNIT FOR DRIVING CEMETERY MARKERS AND METHOD OF USING SAME

David Wilham Fulkerson, 8360 W. Six Mile Road, Northville, Mich. 48167, and Lawrence William Smith, 26950 Taft Road, Novi, Mich. 48050

Filed Oct. 23, 1975, Ser. No. 625,141
Int. Cl.[2] E02D *7/08*; E04H *13/00*
U.S. Cl. 61—53.5 20 Claims



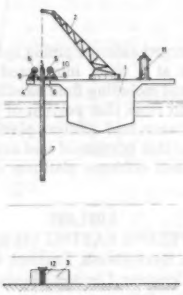
1. The method of reducing maintenance costs at a cemetery having a plurality of grave markers associated with respective burial graves, said markers protruding above the ground surface to an extent sufficient to interfere with the passage of a lawn mower over said markers with the mower blade operating at normal grass cutting heights comprising creating a first downwardly directed impact force distributed over a first area, converting said first force into a second downwardly directed force by a hard first impact against force transmitting means and by distributing said first force over a second area of said force transmitting means, and applying said second force at said force transmitting means directly to a first marker by an impact softer than said first impact and then repeatedly impacting said first marker in the foregoing manner until said marker is driven downwardly into the ground to a level such that it will not interfere with the passage of a lawn mower over said first marker with its mower blade operating at normal cutting heights.

4,051,685

POSITIONING METHOD AND APPARATUS FOR SUBMERSIBLE PILE DRIVING

Joost W. Jansz, The Hague, Netherlands, assignor to Hollandsche Beton Groep N.V., Rijswijk, Netherlands

Filed Apr. 30, 1976, Ser. No. 681,937
Claims priority, application Netherlands, Oct. 13, 1975, 7512021
Int. Cl.[2] E02D *7/10*
U.S. Cl. 61—53.5 4 Claims



1. In an apparatus for submarine pile driving, said apparatus comprising a pile to be driven into the bottom of a body of water and a pile driving head which rests on the top of the pile after being lowered along guide cables from the surface of the body of water, said apparatus comprising:

crossbar means;

attachment means for detachably mounting said crossbar means to the pile near its top;

said guide cables terminating at said said crossbar means and said attachment means comprising release means carried by said crossbar means and responsive to contact of said pile driving head therewith for releasing said pile from said crossbar means.

4,051,686

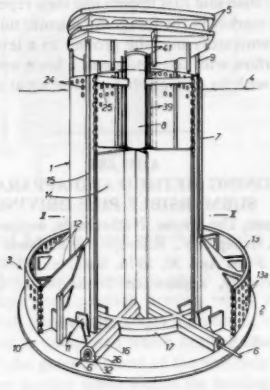
PLATFORMS RESTING UPON THE BED OF A BODY OF WATER

Jacques Edouard Jean Lamy, Fontenay-aux-Roses, France, assignor to C. G. Doris, Paris, France

Continuation-in-part of Ser. No. 521,075, Nov. 5, 1974. This application July 9, 1975, Ser. No. 594,568
Claims priority, application France, July 12, 1974, 74.24310
Int. Cl.[2] E02B *17/00*
U.S. Cl. 61—86 7 Claims

1. In combination with an external piping system resting submerged upon a seabed for conveying a useful fluid between at least two spaced, submerged locations on the seabed, an offshore platform comprising a base structure resting upon the

seabed and having means for supporting a bridge structure emergent from the surface of the sea when the base structure is disposed upon the seabed, said base structure including submerged, mutually isolated work chambers located in said base structure and bounded by at least two watertight walls, said work chambers being maintained dry in their undersea environment, an internal piping system housed in said work chambers, means sealed across said watertight walls for interconnecting said submerged external piping system with said internal piping system at a point interposed between said two spaced locations, and including fluid handling means for pumping said useful fluid from that portion of said external piping system located between said offshore platform and one of said spaced locations to that portion of said external piping system located between said offshore platform and another of said spaced locations.



4,051,687
PIPELINE LAYING METHOD

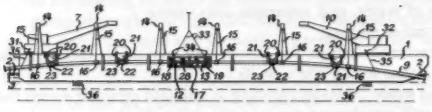
John William Ells, Bexleyheath, England, assignor to The British Petroleum Company Limited, London, England and Saipem S.p.A., Milan, Italy

Filed Sept. 17, 1975, Ser. No. 614,238

Claims priority, application United Kingdom, Sept. 27, 1974, 42188/74

Int. Cl.² F16L 1/04

U.S. Cl. 61—110 **10 Claims**



1. (Twice amended) A method of joining together the ends of two pipelines having an internal diameter of from about 10 to about 60 inches into a continuous length at an offshore location wherein at the commencement of the method at least one of the pipeline ends is submerged in water from about 100 to about 1000 feet in depth, the method comprising:

a. dewatering the submerged pipeline or pipelines over the length to be lifted;

b. initially lifting the submerged end or ends above the surface of the water with at least one first lifting means;

c. positioning buoyancy means along the submerged pipeline or pipelines adjacent the end or ends to be lifted to assist said initial lifting;

d. further lifting the pipelines into engagement with a plurality of longitudinally spaced-apart inverted U shaped brackets with a plurality of longitudinally spaced-apart second lifting means, said inverted U shaped brackets being lockably movable along the vertical plane and pivotal along the horizontal plane and being positioned so that the pipeline ends are presented horizontally end to end in axial alignment for joining;

e. gripping the ends of said pipelines to maintain them in axial alignment;

f. interposing a spool piece between the horizontal, axially aligned ends of said pipelines and welding said spool piece to said ends to form a continuous fluid tight length; and

g. lowering and laterally moving said continuous length of pipeline back to the sea bed to form a loop in a horizontal plane on the sea bed.

4,051,688
OFFSHORE STRUCTURE AND METHOD

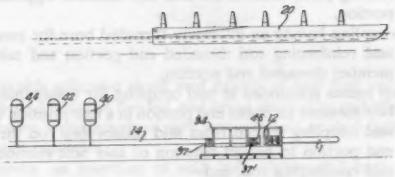
John William Ells, Bexleyheath, and Ian David Parker, Basingstoke, both of England, assignors to The British Petroleum Company Limited, London, England

Filed June 4, 1976, Ser. No. 692,772

Claims priority, application United Kingdom, June 13, 1975, 25356/75

Int. Cl.² F16L 1/00

U.S. Cl. 61—110 **7 Claims**



1. A method of connecting by means of flanges two pipelines lying on the bottom of a body of water which method comprises:

a. disposing a first pipeline having a flange at the end thereof so that the end portion of the pipeline is moveable in the direction of its longitudinal axis to provide adjustment for joining the flanges together,

b. installing on the water bottom a spool frame, the spool frame having releaseable means for holding the end portion of the first pipeline free of the water bottom in a suitable attitude for installing a joining frame, and employing said spool frame to lift the first pipeline at a position a small distance from the end thereof,

c. installing on the water bottom a joining frame, said joining frame having means for supporting the first pipeline and means for supporting a second pipeline having a flange at the end thereof in alignment therewith and, using said joining frame, supporting the first pipeline and supporting the second pipeline in alignment therewith, and

d. connecting the flanges on the supported pipelines together in fluid tight relationship.

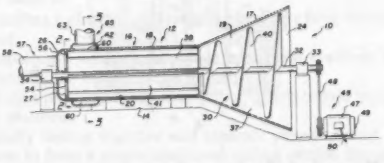
4,051,689
AIR SEPARATING APPARATUS

Ronald A. MacDonald, 904-510 W. Hastings, Vancouver, B. C., Canada (V6B 1L8)

Filed June 8, 1976, Ser. No. 693,974

Int. Cl.² F25B 9/02

U.S. Cl. 62—5 **1 Claim**



1. Apparatus for separating air into relatively warm and cool components comprising a housing having a tapered section and a cylindrical section, said tapered section tapering outwardly

from the cylindrical section and having an open intake end, said cylindrical section having a discharge end remote from the tapered section, an impeller rotatably mounted within the housing and having an axial flow portion and a radial flow portion, said axial flow portion being a feed worm tapered to conform to the tapered section, said radial flow portion having a plurality of radial blades extending into close proximity with an inner periphery of the cylindrical section, said discharge end having first and second port means radially spaced apart with respect to a longitudinal axis of the housing, said first port means being positioned to discharge axially moving air, said second port means being positioned to discharge radially moving air, duct means separately connected to the first and second port means respectively for conducting warm and cool air components away from the housing, and drive means for rotating the impeller.

4,051,690

METHOD AND APPARATUS FOR FREEZING FISH

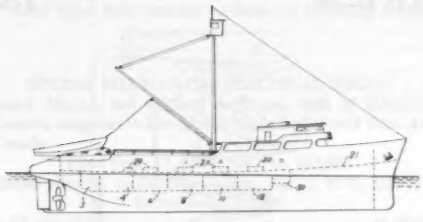
David John Doust, 276 St. James Street West, Suite 417, Montreal, Quebec, Canada (H2Y 1N3)

Filed July 21, 1975, Ser. No. 597,587

Claims priority, application United Kingdom, July 22, 1974, 32366/74

Int. Cl.² F25D *17/02*

U.S. Cl. 62—64 **10 Claims**



1. Apparatus for continous freezing of large fish on board a fishing vessel comprising a fishing vessel, said fishing vessel including a series of in line insulated fish freezing tanks, the said freezing tanks having hatch openings at deck level, and hermetically sealed hatch covers for said hatch openings, means for encapsulating in plastic bags the individual large fish brought on board the fishing vessel and vacuum sealing the bags, and means to feed the encapsulated fish through the hatch openings of the fish freezing tanks, refrigerating apparatus for feeding brine to the series of fish freezing tanks, the said refrigerating apparatus including feeding and return brine headers, pump means for circulating brine through the said header, individual valve controlled feed pipes between said feed brine header and each freezing tank, and individual valve controlled drains from each freezing tank to said return brine header, and brine collecting tanks in which the brine from the freezing tanks is replenished before being recirculated through the refrigerating apparatus.

4,051,691

AIR CONDITIONING APPARATUS

Claude W. Dawkins, 4900 NW. 30 St., Oklahoma City, Okla. 73122

Continuation-in-part of Ser. No. 581,102, May 27, 1975, Pat. No. 3,984,224, which is a continuation-in-part of Ser. No. 423,280, Dec. 10, 1973, Pat. No. 3,885,398. This application Oct. 5, 1976, Ser. No. 729,873

Int. Cl.² F25B *27/00*

U.S. Cl. 62—236 **7 Claims**

1. An air conditioning apparatus employing a heat transfer medium for use in a vehicle having a large passenger area and equipped with an engine and a source of DC voltage, the apparatus comprising:

a first compressor having a suction port and a discharge port;

clutch means for drivingly connecting the first compressor to the engine of the vehicle;

a second compressor having a suction port and a discharge port;

a first electric motor drivingly connected to the second compressor;

a third compressor having a suction port and a discharge port;

a second electric motor drivingly connected to the third compressor;

a first condenser coil having an inlet port and an outlet port;

a second condenser coil having an inlet port and and outlet port;

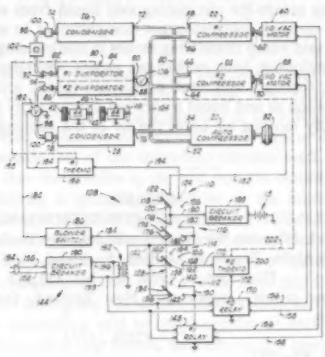
discharge manifold means interconnecting the discharge ports of each of the first, second and third compressors and the inlet ports of each of the first and the second condenser coils, for conducting heat transfer medium from the first, second and third compressors to the first and second condenser coils;

an evaporator coil having a first inlet port providing access to a first half of the evaporator coil, a second inlet port providing access to a second half of the evaporator coil, and an outlet port providing an exhaust path from each of the first and second halves of the evaporator coil;

a first expansion valve connected to the first inlet port of the evaporator coil;

a first liquid conduit interconnecting the outlet port of the first condenser coil and the first expansion valve;

a second expansion valve connected to the second inlet port of the evaporator coil;



a second liquid conduit interconnecting the outlet port of the second condenser coil and the second expansion valve;

suction manifold means interconnecting the outlet port of the evaporator coil and the suction ports of each of the first, second and third compressors, for conducting heat transfer medium from the evaporator coil to the first, second and third compressors; air circulating means having an interior portion connected to the passenger area for moving air from the passenger area over the evaporator coil for return to the passenger area, and an exterior portion for moving air from outside the vehicle over the first and second condenser coils; and

electrical circuit means comprising:

first compressor control circuit means connected to the source of DC voltage and to the clutch means, for connecting the DC voltage to the clutch means in a first position of the electrical circuit means;

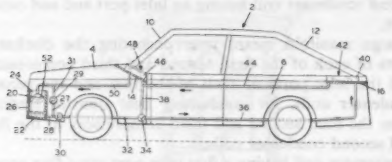
second compressor control circuit means connected to a source of AC voltage and to the first electric motor, for connecting the AC voltage to the first electric motor in at least a second position of the electrical circuit means; and

third compressor control circuit means connected to the source of AC voltage and to the second electric motor, for connecting the AC voltage to the second electric motor in a third position of the electrical circuit means.

4,051,692
COOLING APPARATUS FOR AUTOMOBILE PASSENGER COMPARTMENT

Paul Ku, and Irene Lau Ku, both of 47-50 59th St., Apt. 6E, Woodside, N.Y. 11377

Filed Oct. 12, 1976, Ser. No. 731,659
Int. Cl.[2] B60H *3/04*; F25D *17/04*; F28D *5/00*
U.S. Cl. 62—244 8 Claims

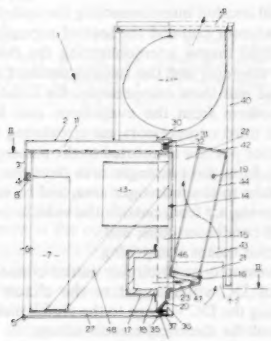


1. A cooling unit for the passenger compartment of a vehicle for cooling such passenger compartment while said vehicle is driven in a forward direction said cooling unit including a vertical body having an air inlet opening, an air outlet opening and an air passageway for moving air entering said body through said air inlet opening through an upward vertical path and out said outlet opening, means adjacent said outlet opening for spraying an evaporatable liquid downwardly through said vertical path through said upwardly moving air, means for catching said liquid sprayed downwardly after said liquid has passed downwardly through said upwardly moving air and pumping means for circulating said liquid from said catching means, through said passenger compartment to said spraying means, said pump circulating means in said passenger compartment including heat exchanger means whereby said liquid passing through said heat exchanger means and cooled by evaporation as said liquid is sprayed downwardly through said upwardly moving air cools the air in the passenger compartment.

4,051,693
SELF-CONTAINED AIR-CONDITIONING UNITS

Frederick Johnston Needham, Auckland, New Zealand, assignor to McAlpine Prestcold Limited, Auckland, New Zealand

Filed Oct. 9, 1975, Ser. No. 621,211
Claims priority, application New Zealand, Oct. 18, 1974, 1175744
Int. Cl.[2] F25D *23/13*
U.S. Cl. 62—262 9 Claims



1. An air conditioning unit comprising:

a housing positionable in an aperture through a partition such as a wall structure of a building;

a space dividing member removably positioned adjacent the end of said housing which is innermost within said building;

said space dividing member having an inclined first surface extending downwardly and outwardly from said building toward said housing;

said housing having an upwardly extending rim terminating in an inwardly and downwardly second surface;

said inclined first surface engaging over said inclined second when said space dividing member is positioned adjacent said innermost end of said housing, said inclined first and second surfaces cooperating to form means, as said space dividing member is inserted toward said housing, for drawing and urging said space dividing member toward said housing to form a seal therebetween and between the exterior and interior of said building;

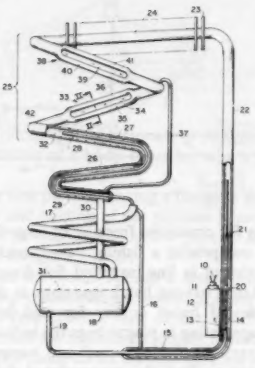
said space dividing member having therein at least one aperture for the passage therethrough of air; and

said space dividing member having operatively mounted thereon a compressor, a condenser and an evaporator.

4,051,694
EVAPORATIVE PRECOOLER FOR AN ABSORPTION REFRIGERATING APPARATUS

Lars Sivert Enger, Bandhagen, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed June 24, 1976, Ser. No. 699,219
Claims priority, application Sweden, June 30, 1975, 7507432
Int. Cl.[2] F25B *15/10*
U.S. Cl. 62—490 9 Claims



1. In an absorption refrigerating apparatus operating with a pressure-equalizing inert gas comprising: an evaporative precooler having two parallel flow paths that are separated from each other by means which heat conductively connects said flow paths to one another, one of said flow paths being located below the other and forming a conduit for the condensate accumulating when said apparatus is operative, the other of said flow paths being situated at a higher level forming a conduit for the partial flow of weak gas, and means being provided for raising the condensate to said weak gas conduit and to moisten the inner wall of said weak gas conduit with said condensate, said means being a channel that extends substantially perpendicular to the longitudinal axes of said parallel flow paths.

4,051,695
ROTATING SHAFT COUPLING FOR USE IN VACUUM

Wayne E. Phillips, Boulder, Colo., and Glen R. Scheuermann, Hollywood, Calif., assignors to Airco, Inc., Montvale, N.J.

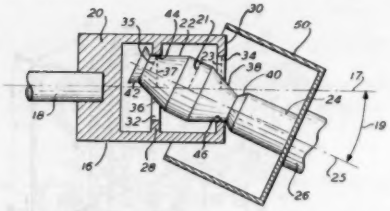
Filed Apr. 27, 1976, Ser. No. 680,542
Int. Cl.[2] F16D *3/02*
U.S. Cl. 64—8 13 Claims

1. A coupling between first and second rotatable shafts for use in vacuum vapor coating apparatus comprising:

a. a socket affixable to an end of the first shaft, the socket

having an opening and two closed loop, axially spaced, interior bearing surfaces;

b. a roller inside the socket and affixable to an end of the second shaft, the roller having two closed loop, axially spaced, exterior bearing surfaces for making rolling contact with the interior bearing surfaces of the socket at two radially opposed and axially spaced locations at



which the radial distance from each exterior bearing surface to the axis of the second shaft is shorter than the radial distance from the contacting interior bearing surface to the axis of the first shaft, whereby the second shaft is disposed at an angle to the first shaft; and

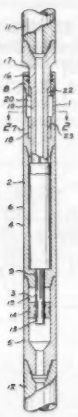
c. means for preventing disengagement of the socket and the roller when their bearing surfaces are in rolling contact.

4,051,696

SPLINE MECHANISM FOR DRILL TOOLS

Leonard Mason, and Clifford Anderson, both of Edmonton, Canada, assignors to Lee-Mason Tools Ltd., South Edmonton, Canada

Filed Sept. 12, 1975, Ser. No. 613,005
Claims priority, application Canada, Apr. 1, 1975, 223511
Int. Cl.[2] F16D *3/06*
U.S. Cl. 64—23 **11 Claims**



1. A spline mechanism for a telescoping tool useful in a drill string which comprises:

a tubular outer part;

a tubular inner part arranged to slide longitudinally within the outer part;

one of said parts being adapted to connect to the upper driving portion of a drill string and the other part being adapted to connect with the lower driven portion of the drill string;

said parts co-operating to form insertable spline-receiving passages;

and a composite insertable spline disposed in at least one passage for interconnecting the tubular parts so that they rotate together in use and may slide longitudinally relative to each other;

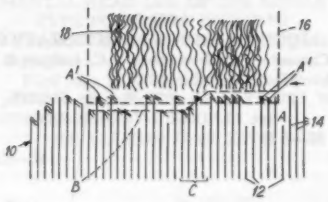
each said insertable spline comprising a substantially rigid body having a driving face that slides relative to the driven tubular part, said face having a slab or coating of deformable, resilient, abrasion-resistant material associated therewith.

4,051,697

HIGH PILE FABRIC

Herbert York, 30 Church Road, Great Glen, Leicestershire, England

Filed Dec. 23, 1975, Ser. No. 643,774
Claims priority, application United Kingdom, Jan. 3, 1975, 00200/75
Int. Cl.[2] D04B *9/12*
U.S. Cl. 66—9 B **4 Claims**



1. A method of producing a high pile fabric simulating an animal pelt or fur on a multi-feed circular weft knitting machine which comprises feeding a plurality of loose fibers in the form of carded slivers to a fiber-collecting station disposed adjacent a needle bed of the multi-feed circular weft knitting machine so that the needles in the bed pass the station during knitting, effecting a needle preselection on the knitting machine to raise selected knitting needles from a first, non-fiber collecting level in which the needles do not collect fibers at said fiber-collecting station to a second, fiber-collecting level in which the selected needles collect fibers from said fiber-collecting station during the passage of said selected needles past said station, permitting said selected needles to collect fiber from said fiber-collecting station, and effecting a needle reselection in predetermined pattern sequence while said preselected needles are collecting fiber from said fiber-collection station so to provide a variation in the needles which collect fiber.

4,051,698

GUIDE BAR ASSEMBLY FOR A WARP KNITTING MACHINE

Herbert Leonhardt, Carboonstraat 15, KerkRade-West, Netherlands

Filed Nov. 5, 1976, Ser. No. 739,191
Claims priority, application Germany, Nov. 13, 1975, 2550921; Nov. 13, 1975, 7536036
Int. Cl.[2] D04B *23/00, 27/00*
U.S. Cl. 66—205 **4 Claims**

1. A guide bar assembly for use in a warp knitting machine, comprising:

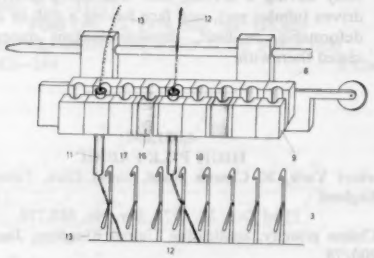
a guide bar including two guide rails moveable relative to each other;

means for mounting said guide bar;

a plurality of independently controllable yarn carrir elements extending transversely between said guide rails;

means for releasing said yarn carrier elements from said guide rail during the knitting process and shifting said

elements in the longitudinal direction relative to at least one of said guide rails, between predetermined positions



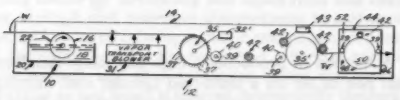
substantially across the full length of said guide bar and means at said positions for receiving a yarn carrier.

4,051,699

LIQUID AMMONIA MERCERIZATION

John B. Carpenter, Jr., Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Sept. 25, 1975, Ser. No. 616,818
Int. Cl.[2] D06B *1/14, 5/08, 7/08*
U.S. Cl. 68—5 D **8 Claims**



1. Apparatus for mercerization of a cellulosic pile or ribbed fabric, the fabric having a pile or ribbed face and a back, said apparatus comprising

means for applying a predetermined amount of liquid ammonia to said fabric less than the amount that would be picked up by said fabric if immersed in liquid ammonia, said means including a metering roller partially disposed in a pan of liquid ammonia and having a surface for engaging the back of said fabric, and means for rotating said metering roller at a predetermined rate, said metering roller having a plurality of deep engravings formed in the surface thereof,

means for tensioning said fabric so that the face thereof is not disturbed after application of liquid ammonia to said fabric, said means including a first cylinder having a plurality of pins associated with the peripheral surface thereof for engaging the back of said fabric,

means for facilitating the removal of ammonia from said fabric by changing the direction of fabric movement without damaging the fabric face and drying said fabric, said means including a plurality of guide rollers for engaging the fabric face and changing the direction of fabric movement, and a second, heated, cylinder for engaging the back of said fabric,

means for brushing the fabric face to substantially restore the original appearance thereof, and

means for further treating said fabric as necessary to remove all of the ammonia therefrom.

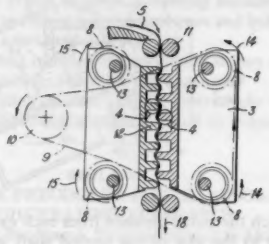
4,051,700

PROCESSING OF LEATHER

Jiri Dokoupil, Guckingen, Germany, assignor to Maschinenfabrik Turner GmbH, Oberursel, Germany

Filed Dec. 1, 1976, Ser. No. 746,329
Int. Cl.[2] C14B *1/40*
U.S. Cl. 69—33 **2 Claims**

1. A machine for the processing of flat, flexible objects, especially for the softening, stretching and glazing of leather; said machine comprising two opposed interengageably processing elements between which the objects are through-fed for processing, both the opposed processing elements being mounted for movement around closed circular paths and the processing elements being arranged so that their paths overlap, and at least a pair of eccentric mechanisms for moving each of the processing elements correspondingly around their closed circular paths with a periodic motion whereby the distance



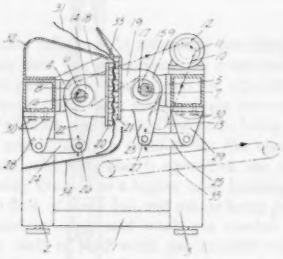
apart of the processing elements is periodically increased and decreased so that the object to be processed is processed during the phase of motion in which the paths of the processing elements interengage and overlap and the object is simultaneously transported through the machine by the processing elements, the processing elements having a component of motion in the through-feed direction during the phase of motion in which the paths of the processing elements overlap.

4,051,701

LEATHER SOFTENING MACHINES

Walter Baum, Frankfurt, and Hans Helmut Brendel, Wehrheim, both of Germany, assignors to USM Corporation, Boston, Mass.

Filed Nov. 22, 1976, Ser. No. 743,753
Claims priority, application Germany, Dec. 2, 1975, 2554175; Dec. 2, 1975, 7538410[U]
Int. Cl.[2] C14B *1/40*
U.S. Cl. 69—33 **10 Claims**



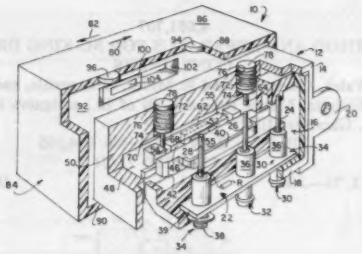
1. A machine for the processing of flat, flexible workpieces by means of two opposing processing members, between which the workpieces are guided through, and whose distance apart is periodically increased and decreased by a relative movement, whereby the workpieces intended for processing is pressed by an arrangement of projections fitted on at least one processing member into an arrangement of corresponding recesses on the other processing member, wherein both processing members execute a feed movement in the closed position, taking the workpiece with it, and in an opened position, by contrast, the processing members execute a return movement.

4,051,702

MAGNETICALLY OPERATED SWITCH LOCK AND KEY THEREFOR

John Phillip Treschitta, South Norwalk, Conn., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed July 28, 1975, Ser. No. 599,692
Int. Cl.[2] E05B *47/00*; H01H *27/00*
U.S. Cl. 70—276 **14 Claims**



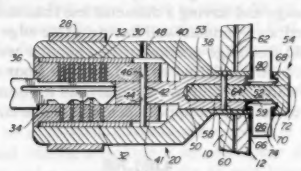
1. A controllable locking mechanism comprising:
an actuating member movable between two positions;
switch means connected to and operable by said actuating member to corresponding switch positions;
at least two release means operable to lock said actuating member and to release said actuating member and located in a coding arrangement;
an external lock housing preventing physical access to said actuating member and said release means with said housing including at least two external surfaces each adjacent a respective one of said release means;
key means including first actuating means having a corresponding coding arrangement to said release means and generating a plurality of fields for operating said release means;
a key housing mounting said first actuating means and having a configuration corresponding to said external lock housing for embracing said external lock housing and automatically positioning said first actuating means in operative relationship to said release means for operating said release means; and
second actuating means carried by said housing for selectively operating said actuating member to said two positions.

4,051,703

BICYCLE LOCK

Charles E. Plaiss, 6834 W. Devon Ave., Chicago, Ill. 60631

Filed Oct. 21, 1976, Ser. No. 734,399
Int. Cl.[2] E05B *9/04*
U.S. Cl. 70—371 **2 Claims**



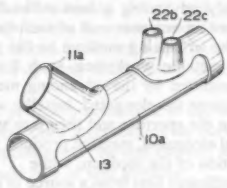
1. A lock for bicycles comprising a cylindrical housing having an enlarged rear end and an integrally-formed forward reduced end, said enlarged end having a large axial bore, said reduced end having a smaller axial bore therein communicating with said large bore, a tumbler mechanism inserted in said large bore and secured thereto, said tumbler mechanism having a housing including an axial bore, a connecting rod secured at one end in said tumbler housing bore and having a face on its opposite end, said connecting rod having an axial bore in said opposite end and said rod partially seated in said bore in said reduced end of said housing, a pin having a shank and a head, said head including an inner face on the side adjacent said shank, a part of said shank anchored in said bore of said connecting rod, a pair of aligned bores in said opposite end face of said connecting rod, a pair of aligned bores in the inner face of said head, a pair of latching members, each latching member having laterally-extending prongs at one end, the prongs being rotatively seated in opposed aligned bores in said inner face of said head and said opposite end face of said connecting rod, a pair of angularly-aligned slots in said reduced end of said housing whereby said latch members are each seated in one of said slots and projected outwardly thereof upon rotation of said tumbler housing which simultaneously rotates the connecting rod and pin.

4,051,704

METHOD FOR THE MANUFACTURE OF AN ORNAMENTAL HEAD LUG OF THE SINGLE UNIT TYPE FOR USE IN BICYCLES

Senkichiro Kimura, 27-3, Higashi-Mukojima 4-chome, Sumida, Tokyo, Japan

Filed May 28, 1976, Ser. No. 690,930
Claims priority, application Japan, Nov. 19, 1975, 50-138209; May 10, 1976, 51-57656[U]
Int. Cl.[2] B21D *39/08, 22/10*
U.S. Cl. 72—58 **9 Claims**



1. Method for the manufacture of an ornamental head lug with a cut wave pattern of the single unit type for use in bicycles from a tubular ferrous blank as a starting material by an oil hydraulic bulge forming press machine in which there are provided with a first sectional die, a second sectional die, a third sectional die, a vertically reciprocating hydraulic ram, and two horizontally opposed and reciprocating rams, the bottom half of each of said sectional die is bolted onto the bed of said press machine and the top half thereof is lowered and held in position by said vertically reciprocating ram, all of said rams are driven by the oil hydraulic pressure, the improvement which comprises inserting said tubular ferrous blank into said first sectional die designed to bulge-form a single protuberant component on said blank, subjecting said blank in said first die to the combined load of a vertical compressive load of said vertical ram, an axial compressive load applied to both ends of said blank through pistons by said horizontal rams, and a high pressure oil supplied into the interior of said blank, inserting the thus bulge formed tubular blank with one protuberant component into said second sectional die designed to form two or twin parallel small protuberant components on the exterior surface of said bulge-formed blank, the parallel direction of said twin components being located perpendicularly to the axis of said tubular blank, subjecting said primary semiproduct in said sectional die to said combined bulge forming pressure to obtain a secondary product with one and twin protuberant components on said tubular blank, inserting said secondary product into a third sectional die designed to form a ornamental joggled cut wave pattern on the exterior surface of said secondary product, mechanically forcing a pair of horizontally opposed mandrels into each end of said secondary product in

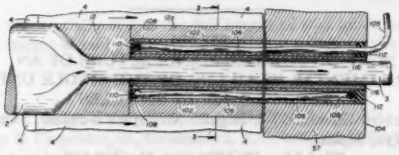
said third sectional die, and forming said pattern on said surface, the outer diameter of said mandrel being bigger than the bore of said secondary product by the order of 1.5 - 2.5 mm., whereby means for eliminating repulsion resulting from the high pressure oil in said tubular blank in said first and second dies and an oil seal means by the serrated shoulder on said piston are not provided.

4,051,705

DIE STEM HEATING

Paul W. Andrus, Cambridge, Mass., and Ronald A. Carter, Levittown, Pa., assignors to Western Electric Co., New York, N.Y.

Filed June 24, 1976, Ser. No. 699,395
Int. Cl.[2] B21D *22/10*
U.S. Cl. 72—60 **9 Claims**



1. A method of extruding an elongated, metallic workpiece through an aperture in a die, which die is supported at an exit end thereof by an apertured die stem, so as to form an elongated, metallic product, the method comprising the steps of:

a. continuously advancing a heat-softenable pressure medium toward an entrance end of said die aperture, while applying the advancing medium to the periphery of said elongated, metallic workpiece, such that frictional drag forces transmitted by the advancing medium along said periphery cause the elongated, metallic workpiece to pass through the die aperture and then into said apertured die stem as said elongated, metallic product, surrounded by at least a portion of the medium; while

b. applying sufficient heat from a source of electrical energy, circumferentially about the periphery of the apertured die stem, to so regulate the temperature of the medium passing with the elongated, metallic product into the apertured die stem as to maintain the medium within the apertured disc stem continuously in a softened state, capable of flowing freely through the apertured die stem with the advancing, elongated, metallic product; and while

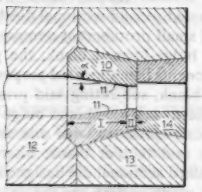
c. electrically isolating the apertured die stem from said source of electrical energy.

4,051,706

METHOD OF MAKING ANISOTROPIC PERMANENT MAGNETS OF MN-AL-C ALLOYS

Yoichi Sakamoto, Hirakata; Nobuyuki Kato, and Tadao Ohtani, both of Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed July 1, 1975, Ser. No. 592,314
Claims priority, application Japan, July 11, 1974, 49-79789
Int. Cl.[2] B21C *23/00*; H01F *1/00, 7/02*
U.S. Cl. 72—253 R **6 Claims**



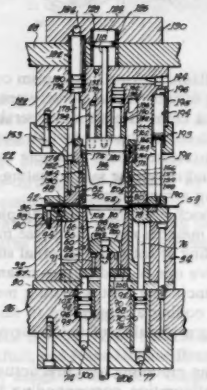
1. A method of making anisotropic permanent magnet which comprises the steps of (1) preparing a polycrystalline body of an alloy comprises of the Mn-Al-C system by melting and casting (2) subjecting said alloy to heat treatment, and (3) warm extruding at a temperature of 530° to 830° C in order to make said alloy anisotropic, said warm extruding step being performed by pushing said polycrystalline body through a converging die with lubricant interposed between said polycrystalline body and said converging die.

4,051,707

METHOD AND APPARATUS FOR MAKING DRAWN CONTAINERS

John Valek, Cicero; Roland E. Miller, Orangeville, and Joseph A. Scaletta, Mount Prospect, all of Ill., assignors to Kraft, Inc., Glenview, Ill.

Filed Feb. 2, 1976, Ser. No. 654,985
Int. Cl.[2] B21D *22/24*
U.S. Cl. 72—348 **10 Claims**



7. A method of making a container from a blank of metallic material of predetermined diameter, comprising the steps of: drawing said blank over an external cylindrical surface on a forming ring having a first predetermined diameter so as to form a drawn container having a substantially planar portion of said predetermined diameter and a cylindrical annular wall portion, engaging an annular portion of said planar portion between a clamping ring applied exteriorly against said annular portion and an opposed forming die applied interiorly against said annular portion, reverse redrawing said annular wall portion between said clamping ring and forming die to form a reverse redrawn container having a bottom floor and an annular flange formed between said opposed clamping ring and forming die, said reverse redrawing simultaneously forming a redrawn annular wall generally normal to the plane of said annular flange and having a diameter less than said first diameter, said redrawn annular wall having a free edge portion, and curling said free edge portion of said annular wall outwardly and downwardly relative to said bottom floor and then inwardly toward said redrawn annular wall to form a curled rim circumferentially of an upper open end of the container.

4,051,708

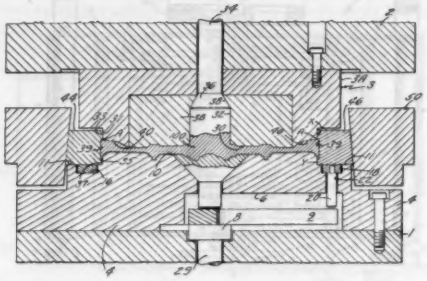
FORGING METHOD

David J. Beane, and Ronald M. Kaplan, both of North Palm Beach, Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 25, 1975, Ser. No. 635,181
Int. Cl.[2] B21D *22/00*
U.S. Cl. 72—354 **5 Claims**

1. A method of forming a disc having integral blades including (1) pressing a billet to a preform shape where the center

part of a disc is formed close to final shape with additional material needed to form the blades being placed at the outer circumference thereof, (2) holding the center formed part ot the preform shape of the disc in place while applying a pressing force to press the additional material into blades, the pressing force being distributed between the center formed part of the disc and the additional material at the outer circumference so



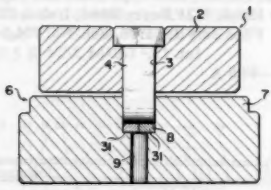
that a greater proportion of the pressing force is placed on the additional material, wherein step (2) a first die engages the center formed part of the preformed shape while a second die having a surface of final shape is held against the additional material of the preformed shape, spacing an upper surface on said second die above a lower surface on said first die, pressing said second die, placing deformable means between said upper and lower surfaces to limit the force transmitted therebetween.

4,051,709

METHOD OF PRODUCING CONNECTOR FITTINGS FOR PIPES

Yoshio Sasahara, Tokyo, Japan, assignor to Kabushiki Kaisha Taishin Seisakusho, Tokyo, Japan

Filed Aug. 16, 1976, Ser. No. 714,905
Int. Cl.[2] B21D *22/00*
U.S. Cl. 72—356 **3 Claims**



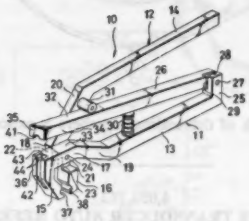
1. A method of producing connector fittings for pipes, comprising attaching a first upper die to an upper die set and a first lower die to a lower die set, respectively, said first upper die having a hole formed in the central part thereof in which a pressure die can be inserted, said first lower die having a cavity formed in the upper surface thereof, placing a pair of blanks in the cavity of said first lower die, pressing said blanks with said pressure die so as to form a semicircular recess in the upper surface of said blanks, attaching a second upper die to said upper die set and a second lower die to said lower die set, respectively, said second upper die having a cavity in its lower surface to receive a second pressure die, said second lower die having a cavity formed in the upper surface thereof, placing said pair of blanks in the cavity of said second lower die, and pressing said blanks with said second pressure die thereby forming a pair of connector fittings, each having a semicircular inner recess for holding flange of a pipe and a pair of surface in which bolt holes are formed.

4,051,710

PULL TAB ATTACHMENT TOOL

Yasuhiro Kobayashi, Nyuzen, Japan, assignor to Yoshida Kogyo K.K., Japan

Filed Dec. 22, 1976, Ser. No. 753,479
Claims priority, application Japan, Dec. 29, 1975, 50-178459
Int. Cl.[2] B21D *9/08*
U.S. Cl. 72—410 **3 Claims**



1. A pull tab attachment tool comprising:

a. a pair of first and second levers having respectively first and second handle portions and opposed first and second jaw portions extending from their one ends in a common direction, said first and second levers being pivotably connected together adjacent to said one ends thereof, said second lever having a roller intermediate the opposite ends thereof, and said first lever having an outwardly opening pull tab-receiving slot at said one end thereof which also opens in a direction away from said first jaw portion and defines a pair of laterally spaced apart seat surfaces at its opening facing away from said first jaw portion;

b. a third lever pivotably connected to the other end of said first lever, said third lever having an outwardly-opening punching depression at one end thereof, and said depression facing said pair of seat surfaces;

c. an urging means acting between said first and third levers and normally urging said third lever away from said first handle portion whereby said third lever is held in rolling engagement with said roller to spread said first and second handle portions apart with said opposed jaw portions held away from each other; and

d. whereby when said first and second handle portions are manually actuated to move toward each other, said opposed jaw portions are brought into engagement with each other to provide a first pressing structure, and said one end of said third lever is brought into engagement with said one end of said first lever through the rolling action of said roller along said third lever, with said punching depression in alignment with said pair of seat surfaces to provide a second pressing structure.

4,051,711

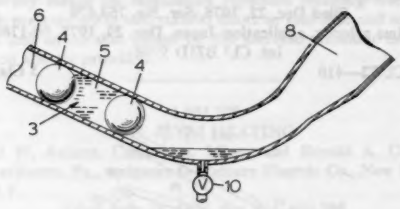
CALIBRATION APPARATUS FOR GAS FLOWMETERS

Alan Thomas Joseph Hayward, East Kilbride, Scotland, assignor to Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Nov. 8, 1976, Ser. No. 740,019
Claims priority, application United Kingdom, Nov. 12, 1975, 46783/75
Int. Cl.[2] G01F *25/00*
U.S. Cl. 73—3 **12 Claims**

1. A mechanical displacement meter prover for gas flowmeters comprising a pipe and a displacer movable along the pipe in response to the flow of gas through the pipe, the pipe having a prover section provided at each end with a detector reactive to the transit of the displacer, and the displacer comprising a

pair of longitudinally spaced, transverse sealing members between which there exists a reservoir of lubricating fluid to



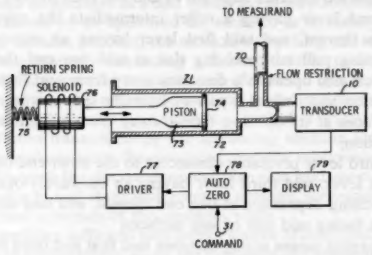
which fluid each of the sealing members is exposed in use of the prover.

4,051,712

PRESSURE TRANSDUCER AUTO REFERENCE

Arthur R. Zias, Los Altos, and Duane R. Tandeske, Pleasanton, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Aug. 20, 1976, Ser. No. 716,316
Int. Cl.[2] G01L *27/00*
U.S. Cl. 73—4 R **10 Claims**



1. In an absolute pressure transducer capable of producing an analog potential representative of the absolute value of an applied pressure, means for calibrating said transducer to a standard reference pressure, said calibrating means comprising:
   - means for producing upon command a reference pressure for a controlled period of time at said transducer input,
   - means for generating a variable calibrating potential during said period of time,
   - means responsive to said analog poential and to said calibrating potential to produce an output indication,
   - means for producing a reference potential representative of the desired transducer output for said reference pressure, and
   - means for stopping the variation in said calibrating potential and holding the calibrating potential fixed when said output indication is equal to said reference potential.

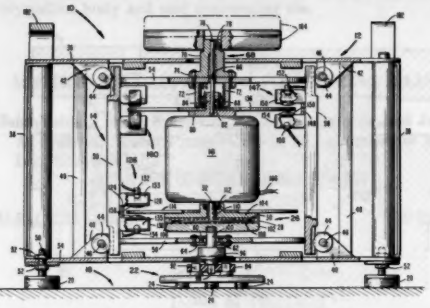
4,051,713

FRICTION MEASURING AND TESTING METHOD AND APPARATUS

Frank W. Bao, Clermont, Fla.; James L. Hummeldorf, Morningview, and Stephen D. Parker, Erlanger, both of Ky., assignors to Actus, Inc., Florence, Ky.

Filed Mar. 23, 1976, Ser. No. 669,594
Int. Cl.[2] G01N *19/02*
U.S. Cl. 73—9 **14 Claims**

1. An apparatus for measuring and testing coefficient of friction characteristics of a surface and the like, the apparatus comprising: an outer frame adapted to be fixed relative to the surface under test; friction pad means mounted rotatably relative to said outer frame and adapted to contact the surface under test; a motor mounted on said outer frame, having a rotatable shaft; torque means for coupling said rotatable shaft to said friction pad means for developing a torque on said friction pad means urging the same to rotate relative to said frame element and hence the surface under test; said torque means forming a coupling between said rotatable shaft and said



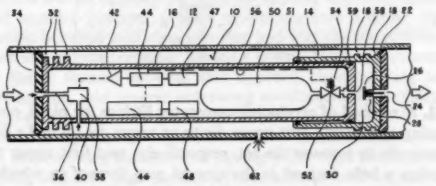
friction pad means which permits rotation of said rotatable shaft to occur without rotation of said friction pad means below torque values representative of static friction torque sensing means for sensing the torque developed by said torque means; and speed sensing means for sensing the rotation of said friction pad means relative to said frame element and hence the surface under test.

4,051,714

SONIC SIGNALLING TRANSDUCER

Harry Robert Fechter, 2298 Capistrano, Las Vegas, Nev. 89121, and Peter Hood, 4721 Royce Road, Irvine, Calif. 92715

Filed July 12, 1976, Ser. No. 704,547
Int. Cl.[2] G01M *3/24*
U.S. Cl. 73—40.5 A **7 Claims**



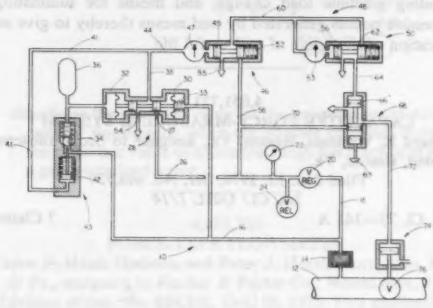
1. A method of locating and recording at remote stations the location of a leak in a pipeline through which a stream of pressurized fluid flows, consisting of the steps of
   a. Inserting a ferret including a cylinder and a piston, each of which is provided with a member substantially obstructing fluid flow therepast, said members being spaced axially of the pipe,
   b. And employing pressure change in the ferret resulting from fluid flow through a pipeline leak aperture to effect release of pressurized gas and resultant propulsion of the piston within the cylinder for generation of sonic waves through the pipeline fluid in both upstream and downstream directions.

4,051,715

LINEBREAK DETECTION SYSTEM

Howard L. Ledeen, Pasadena, and Franz Schmon, Granada Hills, both of Calif., assignors to Ledeen Flow Control Systems, Sun Valley, Calif.

Filed Aug. 30, 1976, Ser. No. 718,757
Int. Cl.[2] G01M *3/28*
U.S. Cl. 73—40.5 R 11 Claims



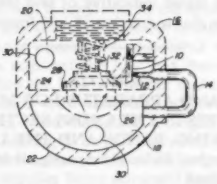
1. A pipeline pressure drop monitoring system comprising:
means for transmitting an actuating signal in response to each decrease in pipeline pressure of a given increment;
timing means activated by receipt of an actuating signal to deliver an energizing signal for a predetermined period; and
output means conditioned while a said energizing signal is imposed thereon to deliver an action signal after a timed delay longer than said predetermined period;
said output means comprising:
a pressure fluid system; and
an on-delay output valve in said fluid system.

4,051,716

LEAK DETECTOR

Joseph R. Mooney, 33 Hawk St., New Orleans, La. 70124

Filed Oct. 8, 1976, Ser. No. 730,767
Int. Cl.[2] G01M *3/04;* F17D *3/04*
U.S. Cl. 73—40.5 R 5 Claims



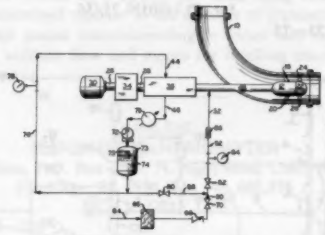
1. In a poppet valve for connection in a fluid pressure line to detect any leakage downstream therefrom, said poppet valve defining up and down stream spaces connected by a valve seat, spring biased closed by a valve mounted to seat therein, and by a bypass of said valve seat, a leak detector comprising:
a. a nozzle defined on the downstream end of said bypass for directing and accelerating a bypass leakage flow; and
b. a blocking lever pivoted in said downstream space with an end opposite said nozzle and adjacent the valve and valve seat, said blocking lever being adapted to be pivoted by said leakage flow from said nozzle to swing an end over the seated valve and limit its displacement from the valve seat and thereby limit a normal pressure fluid flow through the poppet valve to signal the presence of a leak.

4,051,717

TESTING SHAFT SEALS WITHOUT PRESSURING SYSTEM TO OPERATING PRESSURE

J. B. Miller, Houston, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 21, 1976, Ser. No. 678,857
Int. Cl.[2] G01M *3/08*
U.S. Cl. 73—46 13 Claims



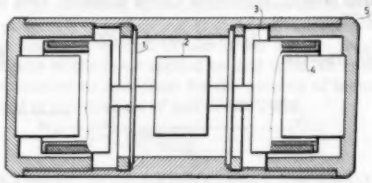
1. A seal test procedure comprising;
introducing a lubricant which is liquid under test conditions into an annulus between a shaft and a surrounding sleeve, said introduction being at a point downstream of said seal, said introduction being under low pressure;
passing said lubricant liquid along said annulus, through a downstream bearing and out to the atmosphere or the at least essentially unpressured interior of a vessel;
maintaining a sealant liquid behind said seal under about normal operating pressure; and
thereafter operating said shaft at about normal operating speed for a short time, and inspecting for vibration, smoking, or a surge of sealant liquid along said annulus which would indicate seal failure.

4,051,718

APPARATUS FOR MEASURING THE VELOCITY OF LOW FREQUENCY VIBRATIONS

Ferenc Meckl, and Péter Piuk, both of Tatabanya, Hungary, assignors to Banyaszati Kutato Intezet, Budapest, Hungary

Filed Jan. 9, 1976, Ser. No. 647,807
Claims priority, application Hungary, Jan. 9, 1975, BA 3186
Int. Cl.[2] G01V *1/28*
U.S. Cl. 73—71.2 4 Claims



1. Apparatus for measuring the velocity of low frequency mechanical vibrations, comprising at least one spring means, a vibratable mass secured to said spring means, at least two coils mechanically coupled to said mass, a core for each coil of a permanent magnetic material, said cores being stationary relative to said coils, at least one of said coils serving as a measuring coil, while at least one other coil is a feedback coil, a controllable current generator having a control input and an output, said measuring coil being connected to said control input and said feedback coil being connected to said output, the current fed through said feedback coil by said current generator being of the same direction as the current generated in said feedback coil by the vibration of said mass.

4,051,719
METHOD AND APPARATUS FOR THE MOISTURE MEASUREMENT OF FLAT STRUCTURES, ESPECIALLY TEXTILE WEBS

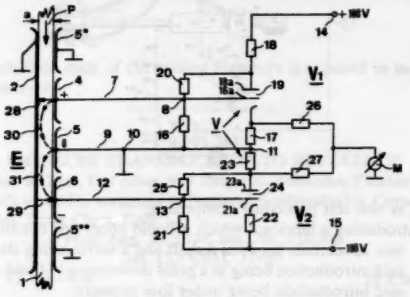
Ernst Loch, Uster, Switzerland, assignor to Zellweger Uster AG, Uster, Switzerland

Filed Aug. 16, 1976, Ser. No. 714,858

Claims priority, application Switzerland, Oct. 20, 1975, 13571/75

Int. Cl.² G01N *25/56*

U.S. Cl. 73—73 **3 Claims**



1. A method of measuring the moisture of substantially flat textile structures, especially textile webs, comprising the steps of: feeding the textile structure along a predetermined path of travel towards a measuring location where there is carried out a measuring operation, removing electrical charges from the textile structure prior to initiation of the measuring operation, carrying out the measuring operation, deriving the useful signal components of the same polarity by means of the measuring operation and dependent upon the conductance of the textile structure, deriving disturbance signal components of opposite polarity which depend upon external voltages, additively processing the useful signal components into a measurement value, and adding the disturbance signal components which by virtue of their opposed polarity at least approximately cancel one another.

4,051,720
ENGINE USEFUL LIFE MEASURING DEVICE

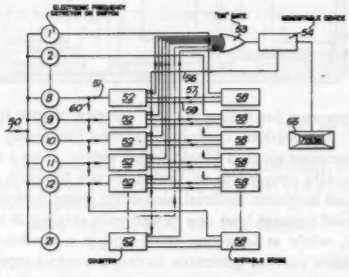
Clive Seymour Barrington, Bristol, England, assignor to Rolls-Royce (1971) Limited, Great Britain

Filed June 8, 1976, Ser. No. 693,870

Claims priority, application United Kingdom, June 18, 1975, 25879/75

Int. Cl.² G01M *15/00*

U.S. Cl. 73—116 **5 Claims**



1. A device for measuring the use of the useful life of a rotating machine, comprising means for generating a signal having a characteristic related to a variable load of the machine; a plurality of detectors each responsive to a different level of said characteristics of said signal, the said detectors comprising a first set of detectors which respond to lower levels of said characteristic and a second set of detectors which respond to higher levels of said characteristic, the means for generating the count being associated only with the second set of detectors; means for generating a count which means is associated with said detectors and arranged to generate a count when the characteristic of said signal changes between predetermined levels of said characteristic consequent upon a corresponding machine load change; and means for summating successive counts generated by said means thereby to give an indication of the usage of said useful life.

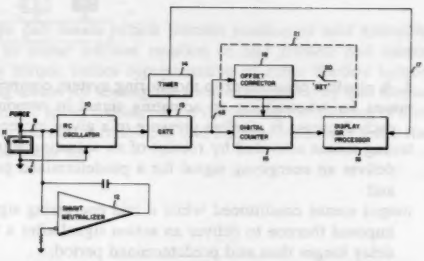
4,051,721
CAPACITIVE FORCE-MEASURING SYSTEM

Richard E. Williams, Reston, Va., assignor to Scope Incorporated, Reston, Va.

Filed Jan. 13, 1976, Ser. No. 648,757

Int. Cl.² G01L *1/14*

U.S. Cl. 73—141 A **7 Claims**



1. A system for measuring force comprising:

first means for producing electrical capacitance reciprocally responsive to said force including an electrical phase and amplitude positive feedback device for neutralizing stray capacitance;

a resistance-capacitance oscillator responsive to said first means for generating an alternating electrical signal whose frequency is reciprocally responsive to said capacitance;

second means responsive to the output of said oscillator for generating a signal indicative of said frequence whereby said signal is also indicative of said force.

4,051,722
METHOD AND APPARATUS FOR MEASURING IRREGULARITIES IN THE CROSS-SECTION OF YARNS, ROVING, BANDS AND THE LIKE

Peter Feller, Benglen, Switzerland, assignor to Zellweger, Ltd., Uster, Switzerland

Filed Feb. 22, 1977, Ser. No. 771,034

Claims priority, application Switzerland, Mar. 22, 1976, 3559/76

Int. Cl.² G01N *33/36*

U.S. Cl. 73—160 **23 Claims**

1. A method of measuring irregularities in the cross-section of textile materials, especially yarns, rovings, bands and the like, comprising the steps of:

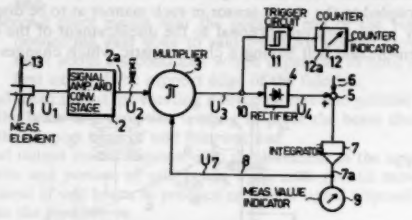
testing the textile material for detecting irregularities in its cross-section;

deriving a textile material-irregularity signal from the detected irregularities;

deriving a measuring signal from the textile material-irregularity signal;

checking the measuring signal with respect to the number of times it passes through at least one predetermined refer-

ence value or a hysteresis range to thereby form an indicator value; and



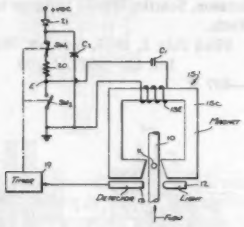
classifying the indicator value for the irregularities as statistically of significance when the number of passes through the reference value or hysteresis range has reached at least a predetermined value.

4,051,723

FORCE-TYPE FLOWMETER

Victor P. Head, Hatboro, and Peter J. Herzl, Morrisville, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Division of Ser. No. 626,832, Oct. 29, 1975. This application Nov. 19, 1976, Ser. No. 743,471
Int. Cl.[2] G01F *1/28*
U.S. Cl. 73—194 E **9 Claims**



1. A flowmeter capable of accurately measuring extremely low flow rates, said flowmeter comprising: A. a flow tube through which the fluid to be metered is conducted in the upward direction; B. a ferromagnetic ball disposed in said flow tube and movable therein, said tube having an upward inclination whereby said ball is subjected to the force of gravity, and in the absence of any other force, tends to fall down said tube; C. a position sensor operatively associated with a detection zone in said tube adjacent the low end thereof to provide a control signal when the ball lies within said zone; D. an electromagnet associated with said tube adjacent the high end thereof to provide, when energized, a magnetic force attracting said ball and seeking to raise it above said detection zone; E. a current controller coupled to said electromagnet to energize same, said controller being governed by the control signal from said position sensor and generating a magnet current to energize said electromagnet, said position sensor producing a control signal which causes said magnet current to pulse and said ball to oscillate at a rate depending on the flow rate of the fluid; and F. means indicating the frequency of said current to provide a reading of flow rate.

4,051,724

FLOW RESPONSIVE COUNTING APPARATUS

Jack S. Segal, Park Forest, Ill., and Harold D. Trapp, Dyer, Ind., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Filed Mar. 2, 1976, Ser. No. 663,176
Int. Cl.[2] G01F *1/00*
U.S. Cl. 73—198 **7 Claims**

1. In a mechanism adapted to perform specified acts on an object, at least one of the acts involving "on-off" flow of liquid under pressure to the object an apparatus for counting the number of transactions comprising in combination

a. conduit means having an inlet and an outlet for carrying the liquid to the object;

b. means mechanically responsive to the liquid flow for measuring volumetric flow of water;

c. means mechanically responsive to liquid flow for totalling "on-off" water flow cycles, the total being related in a predetermined manner to the number of transactions;

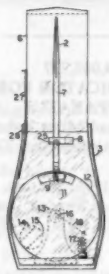
said conduit means interconnecting in series said means for measuring volume flow and means for totalling on-off water flow cycles.

4,051,725

HAND-HELD ANEMOMETER

Alden Schloss, P.O. Box 4862, N. Hollywood, Calif. 91607

Filed Apr. 26, 1976, Ser. No. 680,376
Int. Cl.[2] G01F *1/28*
U.S. Cl. 73—228 **9 Claims**



1. An anemometer, comprising in combination, a vane to be exposed to the wind, said vane being pivotally mounted to a sub-chassis free to rotate in an arc due to force of said wind; connecting means connecting said vane to an upper flexible means, said flexible means extending to, wrapping about and attaching to a first drum section on a drum pivotally mounted on said sub-chassis; rotation of said vane causing a pull on said upper flexible means and causing same to unwrap from said first drum section, causing rotation of said drum; a lower flexible means attached to a second drum section on said drum and extending to and attaching to a spring mounted on said sub-chassis; rotation of said drum causing said lower flexible means to wind on to said second drum section and in so doing causing deflection of said spring; at some sufficient deflection, sufficient tension is applied to said lower flexible means to cause balance of the force applied by said wind; an indicator axially connected to said drum for the purpose of indicating wind speed at any position of said drum.

4,051,726

ELECTRO-OPTICAL LIQUID LEVEL INDICATOR

Albin A. Hastbacka, 3 Singlefoot Road, Chelmsford, Mass. 01824

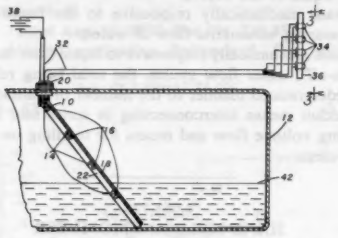
Filed Apr. 6, 1976, Ser. No. 674,214
Int. Cl.[2] G01F *23/00*
U.S. Cl. 73—290 R **4 Claims**

1. A liquid level indicating device comprising:

a transparent rod which is capable of being inserted into a container holding a liquid

a plurality of infrared emitters and photosensors within the transparent rod wherein a photosensor is placed sufficiently distant from the rod surface and an infrared emitter so as to collect a narrow band of infrared rays which are all totally reflected when the emitter-sensor pair is in air and to collect only rays which are not totally reflected

when the emitter-sensor pair is immersed in a liquid; a substrate with conductive paths embedded within the transparent rod which provide for the means to drive the infrared emitters with electric current and provide the



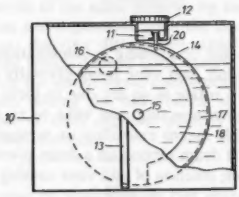
output path for sensing current from the photosensors; and a remote viewing device whereby the level of the liquid in the container is indicated by selective illumination of visible light emitting diodes in a remote viewing device.

4,051,727

LIQUID MIXTURE INDICATOR FOR RUG SHAMPOO APPARATUS

Osten Schwartz, Varmdo, and Milos Vukotic, Bandhagen, both of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Filed June 1, 1976, Ser. No. 691,521
Claims priority, application Sweden, June 11, 1975, 7506680
Int. Cl.[2] G01F *23/08*
U.S. Cl. 73—306 **7 Claims**



1. A liquid mixture indicator for a liquid dispensing apparatus in which the correct proportions of the components in a receptacle are continuously determined comprising: a float on the liquid surface in said receptacle, a movable indicator dial rotatably mounted on the receptacle and operatively connected to said float, said indicator dial at any given time showing through a wall of the receptacle the quantity of each component to be added to obtain the correct proportions of said liquid mixture, an operator member engaging said indicator dial before filling of said receptacle to thereby block the movement of said indicator dial whereby accurate proportions of the components to be added may be determined through said wall, and means for releasing said operator member from engagement with said indicator dial after the receptacle has been filled to a given level.

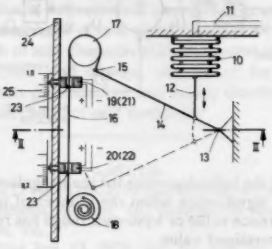
4,051,728

INSTRUMENT FOR MONITORING PHYSICAL PARAMETERS OF TEMPERATURE AND PRESSURE

Walter Metz, Hohenweg 2-6, Moosbrunn, Germany (6936)

Filed Nov. 17, 1975, Ser. No. 632,694
Claims priority, application Germany, Nov. 18, 1974, 2454658
Int. Cl.[2] G01K *1/02*; G01L *19/12*
U.S. Cl. 73—343 R **21 Claims**

1. An instrument for monitoring a physical parameter consisting of temperature or pressure, comprising an elastic sensor displaceable as a function of the physical parameter being monitored, a belt extending over at least two spaced rollers and coupled to the elastic sensor in such manner as to be displaced by an amount proportional to the displacement of the elastic sensor, said belt having a characteristic which changes along



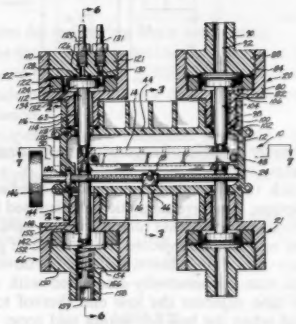
the length thereof, and sensing means responsive to said characteristic of said belt for producing an output signal which varies as a predetermined function of the physical parameter being monitored, said belt also having means for indicating the measured value of the physical parameter that is monitored.

4,051,729

AMPLIFIER BEAM TYPE TRANSDUCER

Petur Thordarsson, Seattle, Wash., assignor to Thordarson, Inc., Seattle, Wash.

Filed July 2, 1976, Ser. No. 702,280
Int. Cl.[2] G01L *13/00*
U.S. Cl. 73—407 R **23 Claims**



1. A transducer, comprising:
housing means forming a beam chamber;
an elongated rigid beam within said chamber;
a fulcrum positioned within said chamber providing a support edge in contact with said beam about which said beam pivots;
adjusting means for moving the fulcrum in said chamber lengthwise along said beam, to in that manner vary the relative lengths of the beam portions on opposite sides of the support edge;
means within said housing for both maintaining said beam on said support edge, for pivotal movement therabout, and for restraining said beam against all other movement, comprising:
a U-shaped yoke including a pair of elongated side members disposed on opposite sides of the beam and a transverse end member interconnected between corresponding ends of said side members, so that the yoke has both a closed end and an open end;
first pivot means near one end of the yoke, connecting said

yoke to said housing for pivotal movement about a first axis which is parallel to the support edge of the fulcrum; and

second pivot means near the opposite end of the yoke, connecting said yoke to said beam for pivotal movement about a second axis which is parallel to both the first axis and the support edge of the fulcrum;

load input means for exerting a force on one end portion of the beam in a direction tending to pivot the beam about the support edge of said fulcrum; and

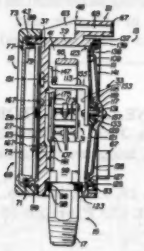
load output means responsive to displacement of the opposite end portion of said beam, upon such pivotal movement of said beam, to produce an output signal responsive to the input force.

4,051,730

CONDITION RESPONSIVE INDICATING INSTRUMENT

Richard A. Andrews, Dearborn, and Thomas E. Noakes, Birmingham, both of MI, assignors to H. O. Trerice Co., Oak Park, Mich.

Filed May 20, 1976, Ser. No. 688,448
Int. Cl.² G01L 7/04
U.S. Cl. 73—416 **30 Claims**



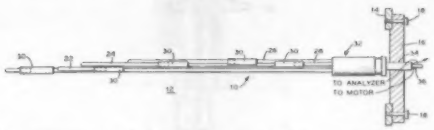
1. In a condition responsive indicating instrument for measuring pressure, temperature or the like, said instrument having an inlet means for communicating with a media whose conditions is to be measured, a Bourdon tube coupled to said inlet means and responsive to a predetermined distinct condition of said media for effecting a corresponding predetermined distinct displacement indicative thereof, mechanical linkage means coupled to said Bourdon tube and including a rotatable shaft, said linkage means being responsive to each predetermined distinct condition-indicative displacement for rotating said shaft through a corresponding predetermined distinct angle indicative thereof, cavity-defining means forming a cavity for enclosing said Bourdon tube and said linkage means, said cavity adapted to be filled with a protective liquid, a dial face having a predetermined range of condition-indicating indicia thereon and a pointer secured to said shaft for rotation therewith and disposed in front of said dial face so as to indicate a predetermined distinct condition-indicative indicia on said dial face which corresponds to said predetermined distinct angle of rotation of said shaft, an improved instrument housing comprising a unitary, integrally formed casing having a generally circular front support plate whose front surface is adapted to mount said dial face and whose rear face is adapted to form one end of said cavity-defining means and a cylindrical wall integral with said support plate and extending rearwardly therefrom to form the sides of said cavity-defining means, said improved housing further including back cover means normally engageable with the rearwardly facing portion of said cylindrical wall and forming the opposite end of said cavity-defining means to prevent the escape of the protective liquid from said cavity but responsive to the attainment of a predetermined unsafe pressure condition within said cavity for disengaging said cylindrical wall and relieving the excess pressure out of the back of said instrument without damage thereto, said back cover means comprising a resilient diaphragm normally closing and sealing said opposite end of said cavity defining means to prevent the escape of the protective liquid from said cavity and a back cover plate normally spaced from said cavity by said diaphragm and engageable with said diaphragm to provide support therefor when said diaphragm is subjected to a safe pressure condition within said cavity, and means for securing said diaphragm and said cover plate in operable position relative to said cavity and to said casing.

4,051,731

FLUID SAMPLING SYSTEM

Thomas L. Bohl, Madison, and Leonard J. Visdos, Lyndhurst, both of Ohio, assignors to Bailey Meter Company, Wickliffe, Ohio

Filed Dec. 30, 1976, Ser. No. 755,720
Int. Cl.² G01N 1/16
U.S. Cl. 73—422 R **9 Claims**



1. A fluid sampling system for analyzing fluids in a duct conducting fluid therethrough comprising:

valve means connectable to a fluid analyzer;

a first sample probe having an inlet located at one point in the duct and an outlet connectable to said valve means and having a single bend of substantially 180° between the inlet and the outlet of said first sample probe; and

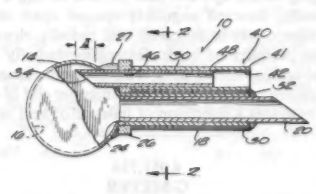
a second sample probe having an inlet located at another point in the duct and an outlet connectable to said valve means, said second sample probe having a length between inlet and outlet substantially identical to the length between inlet and outlet of said first sample probe and also having a single bend of substantially 180° between the inlet and the outlet of said second sample probe to provide substantially identical transport times to fluids conducted through said first and second sample probes from different points in the duct.

4,051,732

MOLTEN METAL STREAM SAMPLER

Richard A. Falk, 519 Westminster Drive, Waukesha, Wis. 53186

Filed May 4, 1976, Ser. No. 683,440
Int. Cl.² G01N 1/12
U.S. Cl. 73—425.4 R **7 Claims**



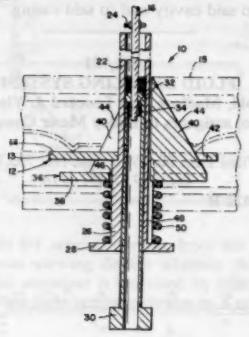
1. A molten metal sampler comprising wall means defining a mold cavity for forming a sample, wall means defining a sample entry passage having an inlet for receiving molten metal and an outlet communicating with said mold cavity, an aperture in said wall means, a pin sample tube extending through said aperture and having an inner end located in said mold cavity remote from the wall means to obtain metal from the interior of said mold cavity to minimize decarburization of the pin sample.

4,051,733

WHEEL BALANCING INSTRUMENT

Sam Tomkin, Box 482 Cantrell Ave., Middletown, N.Y. 10940

Filed Oct. 26, 1976, Ser. No. 735,142
Int. Cl.[2] G01M *1/12*
U.S. Cl. 73—484 **2 Claims**



1. An instrument for indicating the balance condition of a centrally apertured wheel; said instrument being adapted to be pendently suspended from an elevated support and being adapted to carry said wheel in a generally horizontal orientation; said instrument comprising: wheel support means having a generally circularly symmetric upwardly facing surface for generally concentrically engaging a bottom side of said wheel; the top surface of said wheel support means being formed by a generally planar member having a plurality of radially directed elongated apertures therethrough; and elongated generally tubular member extending upwardly fixedly and concentrically from said surface for passage through the center of said wheel; a flexible line means for passage through said generally tubular member; said line means having an upper end for connection to said elevated support; means carried by the center of said wheel support means for engaging a lower end of said line means; centrally apertured upwardly converging means for engaging the center of said wheel; said wheel center engaging means being carried concentrically by said wheel support means for vertical movement along said tubular member; said wheel center engaging means comprising a plurality of vertically and radially oriented angularly spaced apart triangular blades which are slideable respectively through said plurality of apertures; said wheel support means having a generally circular elongated portion projecting downward fixedly from said generally planar member coaxially with said tubular member; spring means disposed about said portion and acting against said wheel center engaging means for urging said center engaging means upward; said portion having a plurality of longitudinally directed angularly spaced apart slots formed therein respectively in line with said radially elongated apertures; said plurality of blades extending radially inward for sliding movement in said slots; wherein a condition of concentricity between said line means and an upper end of said tubular member indicates a condition of balance of said wheel.

4,051,734

G-METER

Reginald R. Skinner, 2511 Wiggins Ave., Saskatoon, Saskatchewan, Canada

Filed June 4, 1976, Ser. No. 693,211
Int. Cl.[2] G01P *15/02*
U.S. Cl. 73—514 **5 Claims**

1. A device for measuring the acceleration and deceleration of an object comprising:

a case;

a transparent dome on said case having a "G" scale associated therewith;

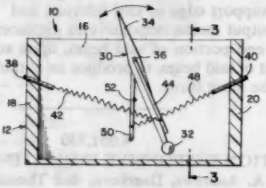
a pendulum pivotally mounted in said case having a weight on one end thereof and a pointer on the other end thereof adjacent said scale; and

means carried by said case for adjusting the rest position of said pendulum relative to a fixed position on said scale,

said adjustment means comprising:

screw means on said case; and

spring means between said screw means and pendulum,



said spring means including

an L-shaped bar whose longer leg is pivotally connected to said case and whose shorter leg is adapted to abut said pendulum;

a top in said case limiting movement of said L-shaped bar to a vertical position in said case; and

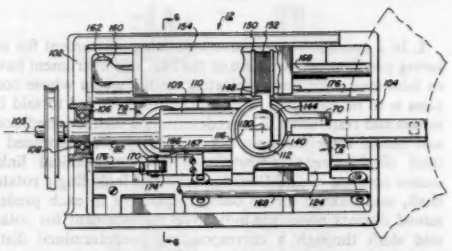
a spring between said screw means and L-shaped bar.

4,051,735

LINEAR ACTUATOR

James L. Johnson, San Jose, and Russell K. Brunner, Santa Clara, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 19, 1975, Ser. No. 633,524
Int. Cl.[2] F16H *21/16*
U.S. Cl. 74—25 **2 Claims**



1. A linear actuator for selectively moving a carriage relative to a support frame along a predefined linear path, comprising:

a drive shaft having a cylindrical surface fabricated of a hardened, corrosion resistant steel having a Rockwell C hardness of approximately between about 63 and 65;

means for rotatably mounting said drive shaft to said frame for rotation of said drive shaft about the axis of said cylindrical surface;

means coupled to said drive shaft for rotating said drive shaft about said axis;

a roller having a peripheral surface fabricated of a polymide plastic having a Rockwell E hardness of approximately about 45;

means for mounting said roller to said carriage with said roller being rotatable about a first axis and pivotable about a second axis perpendicular to said first axis;

means for mounting said carriage to said support frame with said carriage being movable relative to said support frame along said predefined linear path and with the peripheral surface of said roller being in frictional engagement with the cylindrical surface of said drive shaft whereby said roller is caused to rotate about said first axis by rotation of said drive shaft when said first axis is parallel to the axis of

the drive shaft and is additionally caused to move along said predefined linear path during rotation of said drive shaft when said first axis is oblique to the axis of said drive shaft; and

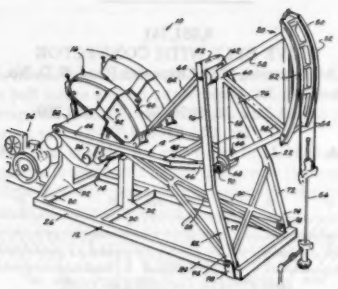
means for controllably pivoting said roller about said second axis to control movement of said roller and thus said carriage along said predefined linear path during rotation of said drive shaft.

4,051,736

PUMP JACK

Gomer W. Jones, Rose Hill, Kans., assignor to Bird Oil Equipment, Ltd., Calgary, Canada

Filed Jan. 14, 1976, Ser. No. 648,932
Int. Cl.² F16H *21/32*
U.S. Cl. 74—41 **5 Claims**



1. An improved pump jack for raising and lowering a polish rod attached to pump rods and a well pump, the jack comprising:

a horizontal base having a front portion and a rear portion;

a pair of counter weights rotatably mounted on the rear portion of said base;

a speed reduction box mounted on the rear portion of said base and disposed between said counter weights and rotatably attached thereto;

an upwardly extending sampson post, said post including a pair of parallel legs, the bottom portion of the legs attached to each side of the front portion of said base, the top portion of the legs secured together;

a pair of horizontal push rods having a first end portion and a second end portion, the first end portion rotatably attached to said counter weights, the second end portion disposed below the top portion of the legs of said post and therebetween; and

a sector head having trapazoidal bracing, said bracing rotatably attached to the top portion of the legs of said post and to the second end portion of said push rods, said sector head having an annular section attached to said bracing, said annular section attached to the polish rod for raising and lowering the polish rod thereon, the load on the polish rod is distributed proportionately on said annular section and through said bracing to said push rod and said post;

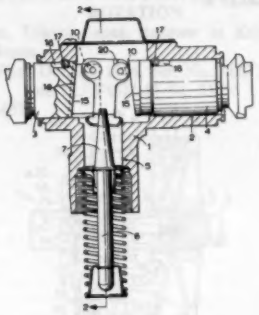
said push rods reciprocating in a horizontal plane, said push rods on their forward stroke raising said sector head, said push rods on their return stroke lowering said sector head.

4,051,737

VEHICLE BRAKES

Albert Charles Hill, Birmingham, England, assignor to Girling Limited, Birmingham, England

Filed May 19, 1975, Ser. No. 578,930
Claims priority, application United Kingdom, May 24, 1974, 23223/74
Int. Cl.² F16H *21/54;* F16D *51/22*
U.S. Cl. 74—110 **8 Claims**



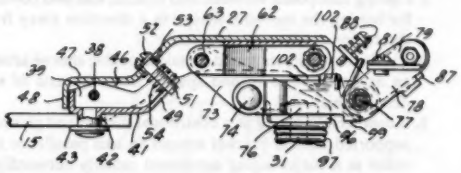
1. A vehicle brake actuator comprising a housing, a wedge member in the housing, follower members in the housing displaceable apart in response to movement of said wedge member and presenting inclined surfaces arranged one on each side of said wedge member, at least one roller interposed between each of said inclined surfaces and the co-operating surface of the wedge member, and a cage in which said rollers are retained, wherein said cage and said rollers constitute an independent cage assembly unattached to said wedge member, said cage assembly and one of said follower members are formed with corresponding abutment means which limit the travel of the cage assembly in the direction of movement of said wedge member, and stop means are provided for limiting movement outwardly of the housing of said one follower member.

4,051,738

SINGLE POINT RESILIENT AND ADJUSTABLE MOUNT FOR DERAILLER

Walter Dian, Downers Grove, Ill., assignor to Beatrice Foods Co., Elgin, Ill.

Filed July 6, 1976, Ser. No. 702,590
Int. Cl.² F16H *7/22*
U.S. Cl. 74—217 B **10 Claims**

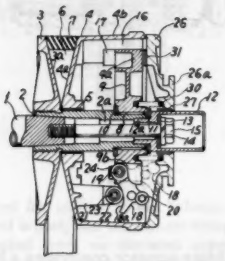


1. A rear derailler for a bicycle having a rear wheel attached to its frame, comprising a bracket attached to the frame of the bicycle adjacent the rear wheel, a derailler member movably attached to said bracket member and flexibly biased away from the plane of the rear wheel, such that upon the application of a force transverse to the plane of the rear wheel acting on said derailler member, the derailler member can move about said bracket and toward the rear wheel, so as to prevent damage to the derailler.

4,051,739
DRIVE CLUTCH FOR THE V-BELT TYPE AUTOMATIC TRANSMISSION

Izumi Takagi, and Noboru Yanagiuchi, both of Akashi, Japan, assignors to Kawasaki Heavy Industries, Ltd., Japan

Filed Jan. 13, 1976, Ser. No. 648,808
Claims priority, application Japan, Jan. 14, 1975, 50-7580[U]; Jan. 14, 1975, 50-758[U]; Jan. 14, 1975, 50-7584[U]
Int. Cl.² F16H 55/52
U.S. Cl. 74—230.17 E 4 Claims

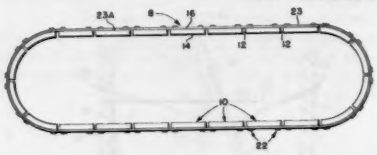


1. A drive clutch device for the V-belt type automatic transmission comprising:
a. a driving shaft;
b. a stationary sheave having a sheave surface and fixed to the driving shaft;
c. a movable sheave having a sheave surface and a hollow cylindrical portion which extends in the opposite direction from the sheave surface and has the free end thereof open, said movable sheave being rotatably and axially slidably mounted on the driving shaft with the sheave surface thereof opposed the stationary sheave, said sheave surface surface of the movable sheave and said sheave surface of the stationary sheave defining therebetween a V-shaped groove in which a V-belt is positioned;
d. a cover enclosing the open end of the cylindrical portion of the movable sheave and also being slidable along the driving shaft;
e. a bracket fixed to said driving shaft for transmitting rotation of the driving shaft to said movable sheave;
f. a spring interposed between said bracket and said cover in for biasing the movable sheave in a direction away from the stationary sheave;
g. a roller rotatably mounted on said movable sheave around an axis transverse to and spaced from the axis of said driving shaft; and
h. a cam weight acting as a centrifugal weight and pivotally supported on said bracket around an axis parallel to said roller as is for swinging movement radially outwardly of said driving shaft and having a concave cam surface in engagement with said roller for urging said movable sheave to slide along said driving shaft against the force of said spring toward said stationary sheave when centrifugal force caused by rotation of said cam weight swings said cam outwardly, thereby varying the pulley diameter, the pivotal axis of said cam weight being radially inwardly of the center of said roller with respect to said driving shaft and in the same direction from the center of the roller as the direction in which the cam weight swings so that said roller is movable along the concave surface of said cam.

4,051,740
SEGMENTAL V BELT

Rajendra K. Narang, 1525 Bonnie Road, Macedonia, Ohio 44056

Filed May 27, 1976, Ser. No. 690,608
Int. Cl.² F16G 1/00, 51/80
U.S. Cl. 74—231 C 18 Claims

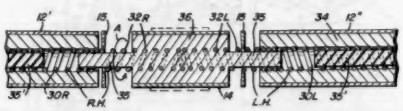


1. A segmental V belt or the like comprising a plurality of body segments, adapted selectively to be joined into an endless belt of any desired length, fastener means partially embedded in said body segments and partially extending radially outwardly therefrom through the radially outer surfaces of said body segments relative to the endless belt formed therefrom, and connection means superimposed on the radially outer surfaces of said body segments to interconnect the adjacent fasteners at the ends of the adjacent segment bodies to form the same into an endless belt.

4,051,741
DRIVE BELT WITH CONNECTOR

George A. Marczewski, 4109 Chapmans Road, R.D. No. 1 Green Hills, Orefield, Pa. 18069

Filed June 21, 1976, Ser. No. 698,200
Int. Cl.² F16G 1/00
U.S. Cl. 74—231 J 21 Claims



1. A drive belt and connector combination comprising; an elongated member of pulley engaging configuration, central means including an elongated element arranged along the center line of the elongated member and extending from one end to the other thereof, and connector means engageable with the said central means for the purpose of connecting the two ends of the elongated member to form a closed belt, said connector means including structure for complementing the central means within the elongated member in order to form a semi-permanent non-unlocking type connection between the two ends.

4,051,742
ARRANGEMENT FOR TENSIONING AND GUIDING THE BELTS OF A CELLULAR PLASTIC FORMING MACHINE

Jan-Olof Johansson, Hoganas, and Karel Spacek, Morarp, both of Sweden, assignors to Gullfiber AB, Billesholm, Sweden

Filed Sept. 3, 1976, Ser. No. 720,412
Claims priority, application Sweden, Sept. 5, 1975, 7509903
Int. Cl.² F16H 7/18, 7/12, 7/10
U.S. Cl. 74—241 4 Claims

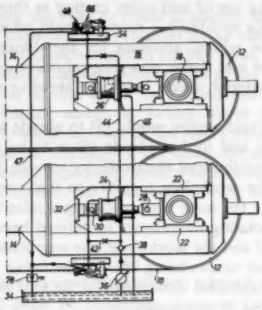
1. In a machine for forming cellular plastic between parallel moving endless belts, an automatic tensioning and guiding system for said belts comprising:
a pair of end rollers within each of said endless belts;
hydraulic cylinder means having a piston coupled to each end of at least one end roller of each of said pairs;
guide means for said at least one end rollers for movably supporting said rollers for displacement longitudinally of

said endless belts in response to displacement of said piston coupled thereto;

a source of hydraulic fluid under pressure;

supply line means connecting said source of hydraulic fluid to said hydraulic cylinder means;

adjustable control valve means for varying the pressure of fluid in said supply line and thus the position of the piston in said hydraulic cylinder means;



senser means for detecting lateral displacement of said endless belt means and for adjusting said control valve means in response to said displacement to increase the pressure of fluid in said supply line;

whereby said at least one end roller of each of said pairs is displaced in said guide means to increase the tension of the endless belt disposed thereon and guide the endless belt back to its normal position.

4,051,743

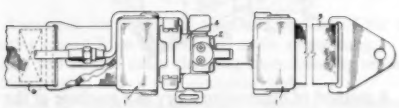
BOX WEBBING ADJUSTER

John A. Gaylord, San Diego, Calif., assignor to H. Koch & Sons, Inc., Anaheim, Calif.

Filed June 11, 1976, Ser. No. 695,077

Int. Cl.² F16H *7/08*; F16G *11/00*; A44B *11/12*

U.S. Cl. 74—242.8 **6 Claims**



1. A box webbing adjuster comprising,

a box having a top wall, a bottom wall, opposite sides between said walls, and an opening at one end between the sides of the box for the passage of the webbing,

a cam extending between said walls across the box parallel with said opening in position for passing the webbing around the cam and out through said opening,

means to journal the cam in said sides of the box,

manipulating means acessible from the outside of the box connected to said cam for manipulating the cam for rotation about an axis substantially parallel with the opening,

the cross-sectional shape of said cam being such that said cam has diagonally opposite risers and the distance between the opposite risers of the cam is about the same or longer than the distance between the top and bottom walls of the box thereby to prevent the cam from assuming a dead center position in the box,

a curved peripheral portion adjacent each riser being of such height as to leave a limited clearance adjacent said top and bottom walls for pressing the webbing against said walls thereby to lock the webbing in the box.

4,051,744

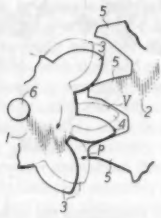
GEAR MECHANISM FOR PREVENTING REVERSE ROTATION

Kenji Oshima, Tokyo, Japan, assignor to Kabushiki Kaisha Seikosha, Japan

Filed Oct. 15, 1976, Ser. No. 732,720

Int. Cl.² F16H *55/04, 55/06*

U.S. Cl. 74—437 **1 Claim**



1. A gear mechanism for preventing reverse rotation comprising:

a drive pinion having alternately disposed wide teeth and narrow teeth and having larger interdental spaces in front of the wide teeth than at the back thereof,

and a follower gear wheel having teeth formed with cutaway portions at their front sides.

4,051,745

MULTIPLE-CONTACT TYPE W-N GEAR

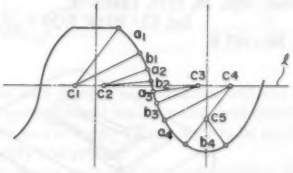
Shoichi Ishikawa, Yokohama, Japan, assignor to Kabushiki Kaisha Hasegawa Haguruma, Tokyo, Japan

Filed Apr. 15, 1976, Ser. No. 677,216

Claims priority, application Japan, Apr. 16, 1975, 50-45155; Oct. 30, 1975, 50-129907

Int. Cl.² F16H *55/06*

U.S. Cl. 74—462 **14 Claims**



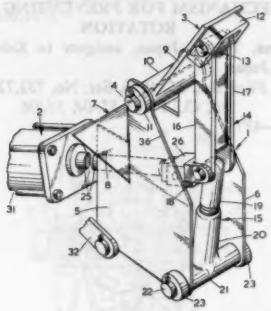
1. A pair of W-N gears in which the tooth profile of one gear is formed of a concave tooth flank and the tooth profile of a mating gear is formed of a convex flank, characterized in that each profile of said concave and convex tooth flanks, on a transverse or normal plane, is formed of substantially a plurality of circular arcs which are the main profiles in meshing, and intermediate curved lines interconnecting said circular arcs, the centers of said circular arcs being arranged on the pitch line or on points adjacent thereto.

4,051,746

MECHANISM FOR OPENING AND CLOSING A MOVABLE MEMBER

Rolf Sven Gunnar Liljeros, 17 Waltham Avenue, Glazebury, Warrington, England

Filed Feb. 20, 1976, Ser. No. 659,639
Int. Cl.[2] G05G *1/04*; B60P *1/26*; E05F *15/04*
U.S. Cl. 74—520 **11 Claims**



1. An apparatus for controlling the movement of a tail-gate of a vehicle body, comprising:

a support securable to the vehicle body adjacent and below the tail-gate;

a flap adapted to bear against the tail-gate;

a collapsible linkage having first and second arms pivotally interconnected on a pivot axis at their one ends to form a toggle, the opposite ends of the arms pivotally connected to the flap and to the support respectively;

actuating means operable to swing the flap between first and second positions for both opening and closing the tail-gate respectively; and

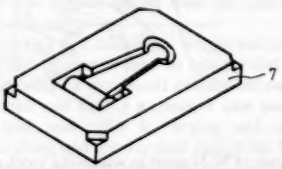
a bracket operatively connecting the actuating means to the linkage, the bracket including means responsive to said pivot axis being immediately on the side of a line joining the opposite ends of the arms remote from the actuating means for preventing collapse of said toggle.

4,051,747

METHOD FOR MAKING A TOOL ELECTRODE FOR ELECTRICAL DISCHARGE MACHINING

Günther Peddinghaus; Harry Neumann, and Horst Wittenstein, all of Ennepetal, Germany, assignors to A.G. fur industrielle Elektronik AGIE Losone b. Locarno, Losone, Switzerland

Filed Oct. 7, 1975, Ser. No. 620,304
Claims priority, application Germany, Oct. 8, 1974, 2447842; Switzerland, Sept. 26, 1975, 12483/75
Int. Cl.[2] B21K *5/20*
U.S. Cl. 76—107 R **6 Claims**



1. A method of machining a tool electrode for use in electrical discharge machining, the method comprising:

a. using a preformed model (**1**), of a shape which is a positive or negative replica of a shape which is to be machined by the tool electrode (**6**), to produce a positive casting (**3**) and a negative casting (**2**) of said shape one of the castings comprising at least on its surface (**31**) which defines said shape, abrasive material and bonding material which holds the abrasive material in place, and the other comprising a material which is readily machinable and which is stable as regards retaining a shape to which it is machined;

b. using the said one casting to abrade the other casting by moving the two castings together so that the positive one enters the negative one and, at the same time, applying a relative circulating but non-rotating movement, as defined herein, to the two castings whereby the said other casting assumes dimensions which deviate from what they were before;

c. making use of said other casting as thus shaped by abrasion for moulding a master mould which, at least on its surface which, allowing for the dimensional deviation, defines said shape, comprises abrasive material and bonding material which holds the abrasive material in place; and

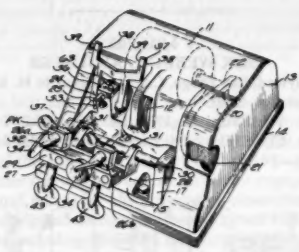
d. using said master mould (**5**) to abrade a workpiece from which said tool electrode (**6**) is to be made, and hence forming the tool electrode, by moving the master mould and the workpiece together so that one enters the other and, at the same time, applying a relative circulating but non-rotating movement, as defined herein, to the master mould and the workpiece, the amplitude of said circulating but non-rotating movement being adjusted to give predetermined dimensions of the tool eletrode in relation to those of said model.

4,051,748

KEY CUTTING MACHINE FOR PRODUCING OBLIQUELY ORIENTED BITTING

Charles F. Sherman, Westminster, Mass., assignor to Unican Security Systems, Ltd, Montreal, Canada

Filed July 20, 1976, Ser. No. 707,037
Int. Cl.[2] B23C *1/16*; B21K *13/00*
U.S. Cl. 76—110 **12 Claims**



12. A method of duplicating a key in a machine of the type wherein a power driven rotary cutter rotating about a fixed axis cuts V bits in a key blank at locations and to depths determined by engagement between a pattern key and a stylus, wherein the stylus and the rotary cutter occupy fixed locations along the axis of the rotary cutter, and a pair of vises having key blade clamping jaws, one to grip the pattern key and the other to grip the key blank, are mounted on common carrier means, wherein the rotary cutter and stylus, as one entity, and the common carrier means, as another entity, are relatively movable with respect to each other to enable any selected V bit in the pattern key to be brought into alignment with the stylus and also effect locating engagement between the selected V bit in the pattern key and the stylus and cutting engagement between the corresponding but unbitted edge of the key blank and the cutter, to thereby bring about the formation of a V bit in the key blank that is a duplicate in size and location of the one engaged by the stylus,

said method being characterized by its capability of enabling the operator to accurately and efficiently duplicate a pattern key in which some at least of the V bits forming

the bitting of the key extend obliquely across its edge, and which to enable that result comprises:

A. mounting the common carrier means for both hinged movement about an axis in fixed parallel relationship to the axis of the rotary cutter and reciprocating movement along its hinge axis;

B. providing for rotation of the vises with respect to their common carrier means about parallel axes that are

1. transverse to said hinge axis and spaced apart the distance between the stylus and the rotary cutter, and
2. parallel to and lie between the key blade clamping jaws;

C. constraining the vises to rotate in unison; and

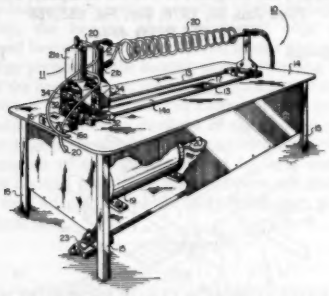
D. manually imparting such rotation to the vises between defined limits at each of which the key blank occupies a plane angularly disposed with respect to the axis of the rotary cutter so that the V bit formed therein as said common carrier means is swung about its hinged mounting towards the axis of the rotary cutter extends obliquely across the edge of the blank, the direction of the obliqueness depending upon which of said defined limits is dictated by the stylus-sensed V bit being duplicated.

4,051,749

CABLE INSULATION STRIPPING APPARATUS

Rex R. Bell, and John W. Sandstrom, both of Dallas, Tex., assignors to Integral Corporation, Dallas, Tex.

Filed Jan. 21, 1976, Ser. No. 650,908
Int. Cl.[2] H02G *1/12*
U.S. Cl. 81—9.51 **2 Claims**



1. Apparatus for removing a defined portion of the outer insulating casing from an electrical cable, comprising:

a. first and second cable clamping assemblies for releasably clamping an end of said electrical cable,

b. means for supporting said cable clamping assemblies at a desired height, said first cable clamping assembly being stationary with respect to said support means, said second cable clamping assembly mounted for reciprocal translation from and toward said first cable clamping assembly in the axial direction of the cable clamped within said cable clamping assemblies,

c. each of said cable clamping assemblies comprising:

i. upper and lower carrier assemblies, one of said carrier assemblies being fixed, the other carrier assembly being mounted for vertical translation toward and away from engagement with said fixed carrier assembly,

ii. first and second jaw members respectively removably connected with said upper and lower carrier assemblies and having mutually aligned semi-circular shaped recessed surface portions for clamping retention of said cable end when said other carrier assembly is translated toward engagement with said fixed carrier assembly, and

iii. a pair of laterally spaced pin carrier frames carried by said upper and lower carrier assemblies, each of said frames defined by upper and lower horizontal frame members joined by vertically extending rod means extending through, and slidably mounted with, said upper and lower carrier assemblies, and opposed ejector pins respectively extending from said upper and lower horizontal frame members and aligned with vertically extending channels in said first and second jaw members, whereby the vertical translation of the other carrier assembly away from engagement with said fixed carrier assembly is effective to engage said upper and lower horizontal frame members with said upper and lower carrier assemblies to drive said opposed ejector pins through said channels, thereby to assist in the release of said cable end from clamping retention by said recessed surfce portions,

d. said second cable clamping assembly additionally having blade means for severing a substantial thickness of said outer insulating casing when the carrier assembly of said second cable clamping assembly is vertically translated toward engagement with the fixed carrier assembly of said second cable clamping assembly, and

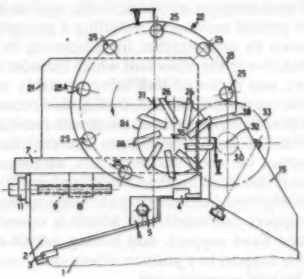
e. means for automatically and sequentially actuating the said other carrier assembly of both said first and second cable clamping assemblies initially toward engagement with the fixed carrier assemblies thereof, then translating said second cable clamping assembly in said axial direction away from said first cable clamping assembly, and thereafter actuating said other carrier assemblies away from engagement with said fixed carrier assemblies and translating said second cable clamping assembly in said axial direction toward said first cable clamping assembly.

4,051,750

MACHINE TOOLS

Marcel Berly, Verrieres le Buisson, France, assignor to H. Ernault-Somua, Velizy-Villacoublay, France

Filed Dec. 28, 1976, Ser. No. 754,994
Claims priority, application France, Jan. 26, 1976, 76.01992
Int. Cl.[2] B23B *3/00, 29/00, 3/16*
U.S. Cl. 82—2 R **5 Claims**



1. In a machine tool comprising a machine bed and a workpiece spindle mounted on said machine bed, said spindle being rotatable about its axis to rotate a workpiece to be machined, a tool turret assembly comprising:

turret support means mounted on said machine bed, said turret support means and said workpiece spindle being relatively movable on said machine bed in a first direction parallel to the axis of said workpiece spindle and in a second direction at an angle to the axis of said workpiece spindle;

a main tool turret for carrying a first plurality of tools, said main tool turret being carried by said turret support means for pivotal movement about an axis parallel to the axis of said workpiece spindle, said main turret having a predetermined inoperative angular position relative to said workpiece spindle; and an auxiliary tool turret for carrying a

second plurality of tools, said auxiliary turret being carried by said main turret for pivotal movement about an axis parallel to the axis of the workpiece spindle, whereby each tool of said second plurality of tools can be selectively brought into an operative angular position relative to said workpiece spindle with said main turret in it predetermined inoperative angular position;

in which turret assembly the improvement comprises:

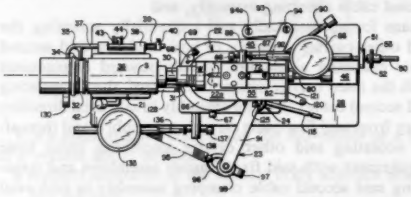
said auxiliary turret being located eccentrically with respect to the pivotal axis of said main turret.

4,051,751

MACHINE FOR GENERATING SURFACES OF VARIOUS CHARACTERISTICS ON WORKPIECES

Otto Estrada, Medellin, Colombia, assignor to Ignacio Acevedo, Columbus, Ohio

Filed Sept. 13, 1976, Ser. No. 722,686
Int. Cl.[2] B23B *3/28*
U.S. Cl. 82—12 **53 Claims**



1. A machine for generating surfaces on a workpiece member comprising a unit for supporting a workpiece member and a unit for supporting a generating tool member so that the tool member carried thereby will engage the workpiece member carried by the first unit, one of said units being mounted for pivoting movement about a pivot so that the tool member will travel across the workpiece member with a predetermined radius, means for advancing or retracting one of said members relative to the other member during the pivotal movement of the unit to change said radius on the surface of the workpiece, said means including an eccentric unit; said unit which is mounted for pivotal movement including a moveable support which supports its said member for advancing or retracting movement relative to the other unit which includes a relatively fixed support, said eccentric unit being rotatably mounted on said moveable support, means for rotating said eccentric unit in response to pivotal movement of the pivoted unit, and means for biasing said moveable support in one direction to cause yielding contact between said members, said eccentric unit being rotatably mounted on the moveable support in cooperative relationship to a contact portion relative to which said moveable support can move and which is operatively connected to said fixed support, said biasing means also biasing said moveable support to a position where said contact portion is engaged by said eccentric unit.

4,051,752

PROCESS FOR GEL CUTTING

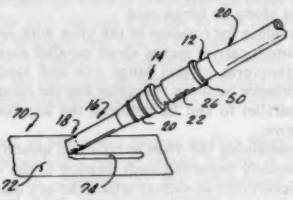
Leo P. Cawley, Wichita, Kans., assignor to Bioware, Inc., Wichita, Kans.

Division of Ser. No. 473,585, May 28, 1974, Pat. No. 3,949,471, which is a continuation-in-part of Ser. No. 294,696, Oct. 3, 1972.
This application Oct. 20, 1975, Ser. No. 623,727
Int. Cl.[2] B26D *3/06*
U.S. Cl. 83—5 **6 Claims**

1. A process for cutting gel comprising:

a. placing a gel on a surface;

b. situating a flattened end of a gel cutting apparatus on said surface coated with said gel, said gel cutting apparatus including a hollow substantially cylindrical body having an inlet and an outlet to provide fluid communication therethrough, a cutter portion attached to said inlet, a vacuum pressure source connected to said outlet, said cutter portion including a structure defining an essentially elongated conduit having said flattened end;



c. moving said flattened end over said surface coated with said gel and thereby channeling a groove in said gel; and

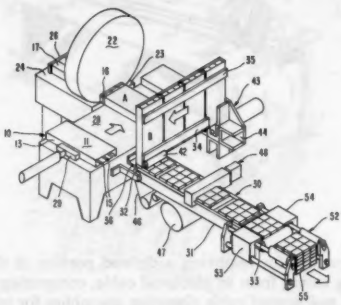
d. removing said gel through said cutter portion by said vacuum pressure simultaneous to said moving step (c).

4,051,753

METHOD AND APPARATUS FOR ASSEMBLING ITEMS

Wayne F. Everman, Cedar Falls, Iowa, and Vincent E. Bernard, Richardson, Tex., assignors to Swift & Company, Chicago, Ill.

Filed Jan. 30, 1976, Ser. No. 653,918
Int. Cl.[2] B26D *4/46*
U.S. Cl. 83—29 **17 Claims**



13. An improved apparatus for assembling quantities of meat patties, said apparatus comprising: a slicer, said slicer having a horizontal bed for supporting a plurality of meat logs in side-by-side relation for simultaneous slicing by a knife as the logs are forced across an anvil by a pusher; a movable magazine having dimensions sufficient to receive columns of patties sliced from each of said logs; first means for supporting said magazine at a first position horizontally aligned with said meat logs; an endless conveyor trained in a path extending in a given direction; second means for supporting said magazine at a second position disposed vertically above said endless conveyor; shuttle gate reciprocably mounted at said second means to sequentially release and discharge patties simultaneously from said magazine; a supply of web material associated with said endless conveyor, said web being disposed on said conveyor to receive said patties when discharged from said magazine; severing means adjacent said conveyor and spaced in said direction from said second means for cutting said web into uniform sheets; and means to stack said sheets with patties thereon.

4,051,754

HEATED CUTTER FOR PLASTICS MATERIALS

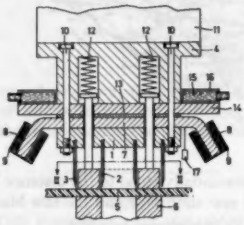
Siegfried Harcúba, Saarbrucken, and Herbert Dits, Schmelz, both of Germany, assignors to Siegfried Harcuba, Saarbrucken, Germany

Filed Dec. 31, 1975, Ser. No. 645,636

Claims priority, application Switzerland, Dec. 31, 1974, 17395/74

Int. Cl.² B26F *1/40*; B29C *17/10*

U.S. Cl. 83—124 4 Claims



1. A cutting apparatus for cutting soft materials such as plastic sheets, said cutting apparatus comprising at least one cutting means, a heated part, and a cooled part, the heated part and the cooled part being separated from each other by a heat insulator, means for continuously operating the cutting means at a predetermined temperature so that the plastic to be cut will be at its transition temperature from solid to liquid, the heated part comprising a heating plate of a high thermal conductivity; and the cooled part comprising a cooling plate of a high termal conductivity, the heating plate comprising edge portions which extend beyond the cutting means, means disposed adjacent the edge portions of the heating plate for heating the edge portions of the heating plate, the cooling plate comprising edge portions which extend beyond the cutting means and means disposed adjacent the edge portions of the cooling plate for cooling the edge portions of the cooling plate, said heated part being connected to said cutting means by heat conductive means, said cooling part being disposed between said heated part and a ram, adapted to actuate said cutting part, to protect said ram from heat.

4,051,755

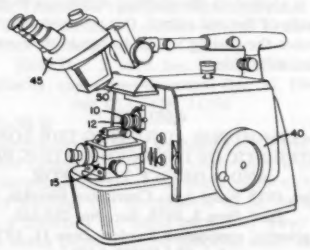
ULTRAMICROTOME AND ATTACHMENT THEREFORE

Dan Raveed, Xenia, Ohio, assignor to Charles F. Kettering Foundation, Dayton, Ohio

Filed Oct. 7, 1976, Ser. No. 730,450

Int. Cl.² G01N *1/06*

U.S. Cl. 83—167 12 Claims



1. An ultramicrotome for preparing sections for electron microscope analysis, comprising:

chuck means for holding a specimen which is to be sectioned,

stationary knife assembly means for cutting said specimen, said knife assembly means including a knife boat for holding a quantity of fluid and a knife held by said knife boat, said knife defining one side of said knife boat,

means for moving said chuck means, and said specimen held thereby, into contact with said knife such that sections are cut from said specimen and floated onto the surface of the fluid held in said knife boat, and

radioactive means mounted on said ultramicrotome for discharging static electric charge which may have accumulated on said chuck means, the specimen, and said knife assembly means, whereby the static electric attractive force on the fluid held in said knife boat is reduced and the fluid prevented from migrating over said knife as said chuck means approaches said knife.

4,051,756

CUTTING ARRANGEMENT

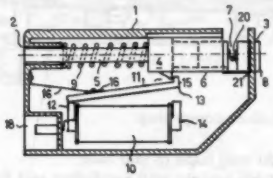
Istvan Bognar, Zurich, and Peter Brassel, Uster, both of Switzerland, assignors to Zellweger, Ltd., Switzerland

Filed Feb. 20, 1975, Ser. No. 551,105

Claims priority, application Switzerland, Feb. 20, 1974, 2313/74

Int. Cl.² B26D *5/08, 7/02*

U.S. Cl. 83—389 35 Claims



1. A cutting arrangement for filament monitoring systems comprising; a slide; means for moving said slide; a filament guide on said slide; gripping means responsive to movement of said slide for gripping said filament arranged on one side of said filament guide; and cutting means responsive to movement of said slide for cutting said filament arranged on another side of said filament guide.

4,051,757

DICING MACHINE

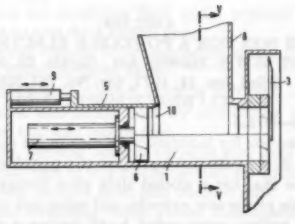
Toni Reifenhäuser, Burglahr, and Helmut Walter Maus, Oberlahr, both of Germany, assignors to Toni Reifenhäuser, Burglahr, Germany

Filed Apr. 26, 1976, Ser. No. 680,477

Claims priority, application Germany, May 6, 1975, 2520068

Int. Cl.² B26D *3/26*

U.S. Cl. 83—404.3 11 Claims



1. A dicing machine for foodstuffs, such as meat, bacon and the like having a magazine which is rectangular in cross-section and which receives the foodstuff that is to be cut, said magazine having a filling aperture extending substantially over its length, lattice-work knives arranged at one open end of the

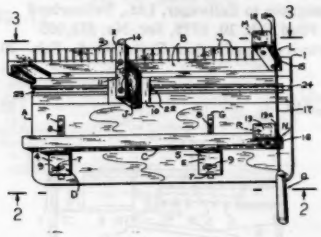
magazine, a piston movable into the magazine to force the foodstuff against said lattice-work knives for extrusion of the foodstuff in strips, one cross-sectional diagonal of the magazine extending horizontally, the length of said diagonal determining the width of the filling aperture and a roof-angle-shaped slider to close said filling aperture, said slider being movable parallel to said piston and having two front cutting edges.

4,051,758

BREAD SLICER USEABLE BY A BLIND PERSON

Lester R. Livick, 15106 Beatty St., San Leandro, Calif. 94579

Filed Feb. 17, 1977, Ser. No. 769,840
Int. Cl.[2] B26D *4/50*
U.S. Cl. 83—437 **2 Claims**



1. A bread slicer comprising:
a. a base;
b. an upright wall fixed to said base;
c. an adjustable upright wall paralleling said fixed wall and being spaced therefrom;
d. means for guiding said adjustable wall for maintaining it parallel to said fixed wall as it is adjusted toward or away therefrom to accommodate an object to be sliced such as a loaf of bread;
e. a loaf pusher slidably mounted between said walls and being movable in a direction paralleling the two walls;
f. a marker carried by said loaf pusher and having a portion overlying the upper edge of said fixed wall, said upper edge having equally spaced apart grooves constituting a scale that can be used by a blind person;
g. a pair of upright magnetized posts positioned near one end of said base so as not to interfere with the object to be sliced from being moved between said posts; and
h. said posts adapted to magnetically attract and support the metal blade of a knife and to act as a guide for the slicing operation as the operator keeps the blade in contact with the posts while cutting.

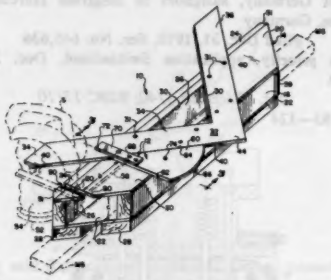
4,051,759

MITER BOX FOR A PORTABLE ELECTRIC SAW

Gerald Oliff, 8530 N. Harding Ave., Skokie, Ill. 60076

Filed Jan. 21, 1977, Ser. No. 761,246
Int. Cl.[2] B26D *7/26*; B27G *5/02*
U.S. Cl. 83—471.3 **20 Claims**

1. A miter box for facilitating 45° cuts in the end portions of a molding strip or the like by means of a portable electric saw of the type that has a slotted slide shoe through which the rotary blade of the saw extends, said miter box comprising an elongated hollow open-ended body having a top wall for sliding reception of the slide shoe of the saw, a strip-supporting bottom wall, and front and rear walls, the opposite ends of said body being bevelled on a 45° bias so that the vertical planes thereof extend at a right angle to each other, and means on said top wall establishing a pair of guide edges for the inside edge of the slide shoe of the saw, said guide edges extending parallel to said bevelled ends of the miter box body and spaced there-



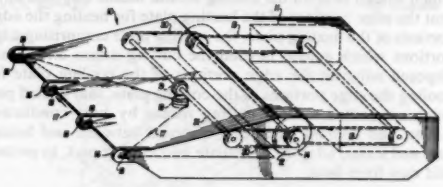
from a distance substantially equal to the distance between the inside edge of the saw slide shoe and the saw blade.

4,051,760

SHEARING APPARATUS

Michael John Glennan, 8 Congewoi Road, Mosman, Sydney, Australia (2089)

Filed July 2, 1975, Ser. No. 592,800
Claims priority, application Australia, July 4, 1974, 8084/74; July 22, 1974, 8283/74; Apr. 14, 1975, 1229/75; June 5, 1975, 1882/75
Int. Cl.[2] B26B *19/24*
U.S. Cl. 83—801 **22 Claims**



1. A cutting unit for a shearing apparatus comprising a flexibly curvable comb having teeth on the intended concave surface thereof, the comb cooperating with a cutting means located behind and adjacent to the upper part of the teeth of the comb, and when the toothed surface of the comb is applied in a flexed condition to the body of an animal to be shorn, the comb and the co-operating cutting means conform as required to the contours of the animal's body and when forward propulsion force is applied to the shearing apparatus to propel same over the body of the said animal, this propulsion force simultaneously assists the cutting means to break or sever the fleece from the animal's hide.

4,051,761

METHOD FOR ADJUSTING THE TONE CHARACTERISTIC OF TONE GENERATING ELEMENTS AND A DEVICE THEREFOR

Artur Nylen, 6888 Ward Ave., Charleston Heights, S.C. 29405

Filed June 3, 1975, Ser. No. 583,441
Claims priority, application Sweden, June 11, 1974, 7407717
Int. Cl.[2] G10H *3/00*
U.S. Cl. 84—1.15 **5 Claims**

1. A method for adjusting the tone characteristics of tone generating elements such as strings of musical instruments including a bridge for said strings, said tone generating elements at least being partly of a magnetizable material, comprising the steps of permanently arranging a solenoid near to, but

out of contact with said elements and separate from the bridge, electrically connecting said solenoid to an amplifier and moving a magnet along each of said tone generating elements

separately towards and away from the part thereof which faces the center of said solenoid and dimishing respectively the loudness of the reproduction and altering the tone characteristics thereof.

4,051,762

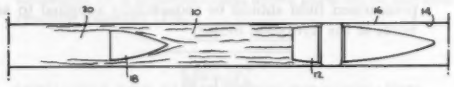
LIQUID PROPELLANT WEAPON SYSTEM

Eugene Ashley, Burlington, Vt., assignor to General Electric Company, Burlington, Vt.

Division of Ser. No. 575,283, May 7, 1975, Pat. No. 4,011,817, and Ser. No. 707,144, July 20, 1976, which is a division of Ser. No. 469,507, May 13, 1974, abandoned. This application Sept. 30, 1976, Ser. No. 728,355

Int. Cl.² F41F *1/04*

U.S. Cl. 89—7 **5 Claims**



1. A method of propelling a projectile from a bore of a gun comprising:

providing a series in said bore of said gun a projectile, a charge of liquid propellant aft of said projectile, and a cavity generator aft of said projectile and said charge;

providing a volume of combustion gas in said bore of said gun aft of said cavity generator to create a combustion cavity; and

translating said generator forwardly into said charge of liquid propellant to enlarge said combustion cavity and to pass liquid propellant aftwardly into said cavity.

4,051,763

ARMAMENT SYSTEM AND EXPLOSIVE CHARGE CONSTRUCTION THEREFOR

Franz Rudolf Thomanek, Landkreis Schrobenhausen, Germany, assignor to Messerschmitt-Bolkow-Blohm Gesellschaft mit Beschrankter Haftung, Munich, Germany

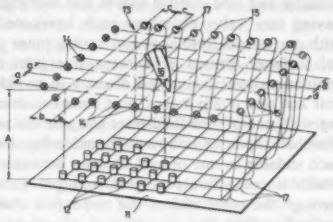
Filed Dec. 2, 1965, Ser. No. 512,039

Claims priority, application Germany, Dec. 11, 1964, 978036

Int. Cl.² F41H *11/06*

U.S. Cl. 89—36 R **17 Claims**

1. A protective system for a fortification such as a bunker, tank, airplane hangar and the like, comprising a plurality of explosive charges, means mounting said explosive charges in a grid pattern adjacent the fortification to be protected and oriented in a direction for firing outwardly away from the fortification along predetermined shooting lines, and sensing means at a location spaced outwardly from said charges in a direction away from the fortification including sensing actuating means in alignment with each charge, each sensing actuating means being connected to each charge with which it is in alignment for firing the associated charge upon sensing an incoming enemy warhead, whereby the explosion of said charge will cause the premature explosion of said warhead at a spaced location from the fortification, said explosive charges including a plurality of charges arranged in a plurality of rows, one behind the other, each of said rows including a supporting



plate, the supporting plate between adjacent rows having shooting openings for permitting penetration of the solid matter of an explosive charge in the row therebehind on explosion thereof.

4,051,764

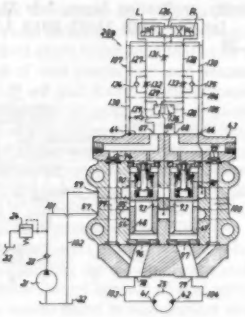
HYDRAULIC ACTUATING SYSTEM

Hikaru Murata, No. 1734, Sakakura, Sakahogi-cho, Kamo, Gifu, Japan

Filed June 5, 1975, Ser. No. 583,874

Int. Cl.² F15B *13/042*

U.S. Cl. 91—29 **4 Claims**



1. A hydraulic actuating system, comprising

a hydrulic actuator having a fluid intake port and a fluid discharge port;

first means forming a fluid supply line which communicates with said intake port of said hydraulic actuator;

second means forming a fluid discharge line which communicates with said discharge port of said hydraulic actuator;

a fluid reservoir;

pump means for supplying fluid under pressure from said reservoir to said fluid supply line;

a closed center control valve interposed in said fluid supply and said fluid discharge lines;

an adjustable inflow control valve in said fluid supply line upstream of said intake port for controlling the rate of fluid flow into said intake port;

an adjustable outflow control valve in said fluid discharge line downstream of said discharge port for controlling the rate of fluid outflow from said outflow port;

two position switching value means communicating with said fluid lines intermediate said hydraulic actuator and said control valves for detecting a pressure difference between said fluid lines which results from a difference between the fluid requirements of said hydraulic actuator and fluid flow rate permitted by said control valves, and for communicating that one of said fluid lines which has

the lower detected pressure with said reservoir via a low pressure relief valve so as to prevent excessive pressure build-up in the respective lines; and

an amplifier valve assembly intermediate said hydraulic actuator and said control valves and including a housing having two valve chambers each interposed in parallel with one of said fluid lines and having inner circumferential surfaces formed with respective inlet and exhaust annular grooves connected directly to swaid fluid reservoir and said pump means, port means each communicating with one of said fluid lines and one end of said valve chamber, a pair of hollow inlet and exhaust valve spools each slidable in one of said chabers between positions in which it respectively permits and prevents fluid flow through the other end of the respective chamber to the respective fluid line to join with the fluid flow in the respective fluid line from said closed center control valve, and wherein said control means form differential pressure-detecting pilot-flow circuit means for controlling the extent of movement of said valve spools between said positions thereof in dependence upon the detected pressure difference between said fluid lines.

4,051,765

ELECTRIC-HYDRAULIC PULSE MOTOR HAVING AN IMPROVED ROTARY GUIDE VALVE MEANS

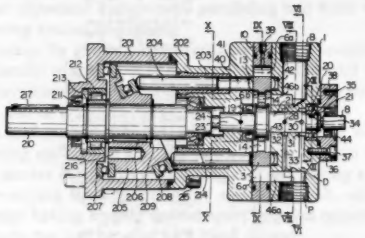
Shoichi Saito, Karatsu, Japan, assignor to Nisshin Sangyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 597,816, July 7, 1975, abandoned. This application June 1, 1976, Ser. No. 692,021

Claims priority, application Japan, July 23, 1974, 49-84906

Int. Cl.[2] F15B *21/02;* F01B *3/10*

U.S. Cl. 91—35 **23 Claims**



1. In an electric-hydraulic pulse motor consisting of a hydraulic motor having a housing, a rotor and a plurality of bores formed in said housing and disposed circularly around the axis of rotation of said rotor for being supplied in order with pressurized fluid to actuate said rotor; and rotary guide valve means adapted to be connected to signal input means such as an electric pulse motor for sequentially supplying the pressurized fluid to said bores, the rotary guide valve means comprising:

means defining a valve chamber with which said bores in the hydraulic motor communicate;

a valve shaft and a signal input shaft movably supported in said valve chamber defining means in engagement with each other for relative movement relative to each other, at least one of said shafts being rotatable in said means and having a portion thereof extending through said valve chamber;

a valve member in said valve chamber having an annular portion dividing said valve chamber into an outer valve chamber portion and an inner valve chamber portion, said annular portion having an annular closure surface which closes the ends of all the bores of said hydraulic motor when the valve member is in a central position between said inner and outer valve chamber portions, said valve member being provided with an elongated opening at the center thereof through which said portion of the shaft in the valve chamber extends so as to divide said opening into two sections;

means yieldably biasing said valve member to its central position;

means operatively associated with said valve member and said portion of the shaft in the valve chamber for preventing relative rotation between said valve member and said one of said shafts while allowing the valve member to move transversely relative to said one of the shafts to either of two eccentric positions in which the bores on one side of the annular portion communicate with the outer valve chamber portion and the bores on the opposite side of the annular portion communicate with the inner valve chamber;

means engaging with said valve member for closing both sides of each of said sections of said opening thereby forming two variable size fluid chambers on the opposite sides of said shaft portion in the valve chamber;

passage means for supplying pressurized fluid to each variable size fluid chamber and discharging the fluid therefrom, said passage members each having throttle means at a portion thereof where said valve shaft and said input shaft engage with each other, said throttle means being for varying the fluid pressure in at least one of said variable size fluid chambers according to the relative movement between the two shafts;

conduit means for connecting a source of pressurized fluid to one of said valve chamber portions and connecting the other portion to a discharge port; and

means for interconnecting said rotor of the hydraulic motor to said valve shaft for causing the valve shaft to rotate in the same direction as the rotational direction in which the pressurized fluid should be sequentially supplied to said bores in the hydraulic motor.

4,051,766

ARRANGEMENT FOR STEERING-POWER LIMITATION IN HYDRAULIC SERVO-STEERING SYSTEMS

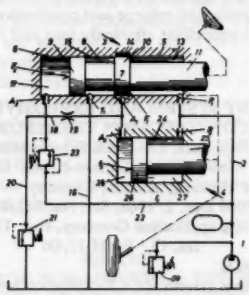
Günter Strauff, Kaarst, Germany, assignor to Langen Company, Dusseldorf, Germany

Continuation of Ser. No. 316,397, Dec. 18, 1972, abandoned. This application Jan. 21, 1975, Ser. No. 542,671

Claims priority, application Germany, Dec. 17, 1972, 2162631

Int. Cl.[2] F15B *15/17, 11/08, 13/04*

U.S. Cl. 91—417 R **5 Claims**



1. An arrangement for limiting the steering power in hydraulic servo-steering systems for vehicles having steerable wheels and

a steering wheel,

a servo-motor (**4**) having

a cylinder (**24**),

a piston (**26**) and

a piston rod (**25**) defining larger (**28**) and smaller (**27**) working areas, the smaller working area (**27**) being continuously connected with a pressure source (**1**),

the servo-motor (4) being operatively connected with the steerable wheels,

a comparator means (3, 3o) being operatively connected with the steering wheel and provided for the relay of a steering sensation to the steering wheel,

the comparator means (3, 3o) including an activator means (33, 34; 11),

a first reaction chamber (17) of a larger effective reaction area (F_2) and

a second reaction chamber (42) of a smaller effective reaction area (F_1) continuously connected with the pressure source (1) and

a three way, three position control valve portion (7, 31) controlling a pressure medium flow from the pressure source (1) to the larger working area (28) of the servomotor (4) or from said larger working area (28) to a return flow (T_1, 16),

said larger working area (28) of the servo-motor (4) being connected by a restrictor (19) with the first reaction chamber (17),

the smaller working area (27) of the servo-motor (4) 41 and the pressure source (1) being connected with the first reaction chamber (17) by a pressure release valve (23),

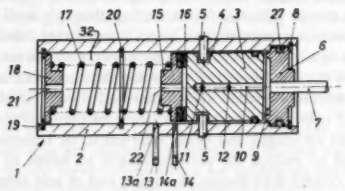
said pressure release valve (23) opening during the reduction of a predetermined lower pressure in the first reaction chamber (17) or during the exceeding of a predetermined pressure difference between the smaller working area (27) and the first reaction chamber (17),

and the first reaction chamber (17) being connected with 51 and exhaust passage via a pressure limitation valve (21), with said pressure limitation valve (21) preventing the exceeding of a predetermined upper pressure of the first reaction chamber (17).

4,051,767
ACTUATOR FOR FLUID PRESSURE-OPERATED POWER DEVICES

Dieter Landsberg, Riemenschneiderstrasse 17, 4041 Allerheiligen, Germany

Filed July 17, 1975, Ser. No. 596,782
Int. Cl.[2] F15B *13/042*
U.S. Cl. 91—420 2 Claims



1. In a system including a fluid motor means; means for supplying pressurized fluid from a pressure source to energize the fluid motor means; a switch means having a first switching state in which pressurized fluid is introduced from the pressure source to the system and a second switching state in which communication is blocked between the pressure source and the system and the system is depressurized; the improvement comprising

a. a sole first pressure conduit having a first end and a second end; said first end being connected to the pressure source with the interposition of said switch means;

b. an actuator including

1. a cylinder having a cylindrical wall defining a pressure chamber to which said second end of said first pressure conduit is connected and an exhaust chamber;

2. at least two coupling ports provided in said cylindrical wall; said ports being axially spaced from one another;

3. a guide pin secured to said cylindrical wall and projecting into a space bounded by said cylindrical wall;

4. a piston disposed in said cylinder with a close fit and arranged for axial and angular displacement; said piston having a cylindrical lateral surface and a radial end face which bounds said pressure chamber; said piston separating said pressure chamber from said exhaust chamber in a fluidtight manner by a first sealing means carried by said piston; said piston having a first axial position and a second axial position;

5. means defining a passage between the cylindrical wall of said cylinder and the cylindrical lateral surface of said piston;

6. pressing means urging said piston in said first axial position; said piston being moved into said second axial position by the pressurized fluid when admitted into said pressure chamber from said pressure source through said first pressure conduit; said piston being moved into said first position by said pressing means upon depressurization of said pressure chamber;

7. means defining a helically extending groove in the piston surface; said guide pin projecting into said groove for effecting a rotary motion of predetermined angle of said piston during axial movement of said piston from one of its positions into the other;

8. a bore extending into said piston from said radial end face;

9. axially spaced channels provided within said piston; said channels starting at said bore and terminating at said cylindrical lateral surface of said piston; said channels establishing communication between said pressure chamber and a selected one of said ports when said piston is in said second position; the magnitude of the predetermined angle being such that upon each successive arrival of said piston into said second position a different one of said ports communicates with said pressure chamber; in said first axial position of said piston each said coupling port is in communication with said exhaust chamber through said passage and in said second axial position of said piston each said coupling port other than that pressurized from said pressure chamber is in communication with said exhaust chamber through said passage;

10. second sealing means carried by said piston and individually surrounding the mouth of each said channel on said cylindrical lateral surface of said piston; said second sealing means being in engagement with the cylindrical wall of said cylinder for blocking communication, in said second axial position of said piston, between said exhaust chamber and any coupling port pressurized from said pressure chamber; and

c. second pressure conduits equalling the number of said ports; a separate one of said second pressure conduits being connected, at one end, to a separate one of said ports and, at another end, to said fluid motor means.

4,051,768
CONVERSION KIT FOR AN AUTOMOBILE AIR CONDITIONING UNIT

Wayne Bayles, 6006 Craig St., Springfield, Va. 22150

Filed Nov. 2, 1976, Ser. No. 738,241
Int. Cl.[2] B60H *1/00*
U.S. Cl. 98—2 2 Claims

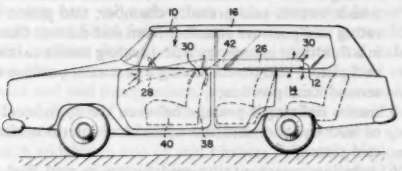
1. A conversion kit for transfering cool air of an automobile air conditioning unit to a rear portion of an interior of an automobile, which comprises:

a. a rectangularly shaped frame formed from a ferrous metal;

b. an adhesive backing disposed on one side of said metal frame, said adhesive backing adapted to be adhesively secured to a dashboard of said automobile around an air register of said air conditioning unit;

c. an elongated flexible thermoplastic tube member having a pair of open ends and a continuous bore therethrough;

d. a rectangularly shaped frame element affixed to one said end of said tube member, another said end of said tube member extending into said rear portion of said interior of said automobile; and



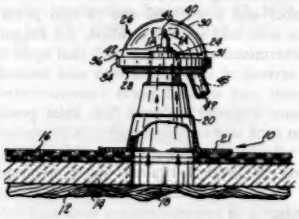
e. a magnetic flexible gasket adhesively secured to said frame element, said gasket magnetically affixed to said metallic frame.

4,051,769

SOLAR POWERED METHOD AND APPARATUS FOR VENTING GASEOUS MATERIAL FROM AN ENCLOSED SPACE TO ATMOSPHERE

Malcolm H. Nickerson, Chagrin Falls, and William R. Rinker, Cuyahoga Falls, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 27, 1975, Ser. No. 608,183
Int. Cl.² F24F 7/02
U.S. Cl. 98—43 R **8 Claims**



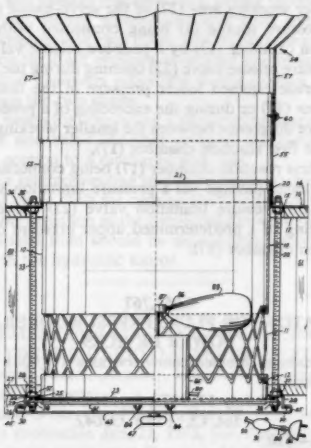
1. Solar powered apparatus for venting gaseous fluid from a substantially enclosed space to the atmosphere comprising a fluid passage having an intake portion disposed to be placed in fluid communication with the enclosed space, said fluid passage having an exhaust portion, a chamber surrounding the exhaust portion of said fluid passage with the exhaust portion in fluid communication with the interior of the chamber, first pressure sensitive valve means between said exhaust portion and the interior of said chamber, said first pressure sensitive valve means being responsive to the fluid pressures in said fluid passage and in said chamber such that it permits flow of fluid from said fluid passage into said chamber when the fluid pressure in said fluid passage exceeds the fluid pressure in said chamber by a predetermined amount and blocks flow of fluid from said chamber into said fluid passage when the fluid pressure in said chamber exceeds the fluid pressure in said fluid passage by a predetermined amount, second pressure sensitive valve means between the interior of said chamber and the atmosphere, said second pressure sensitive valve means being responsive to the fluid pressure within said chamber and to ambient pressure such that said second pressure sensitive valve means is adapted to open to exhaust fluid material from said chamber to the atmosphere when the pressure within said chamber exceeds ambient pressure by a predetermined amount and said pressure sensitive valve is adapted to close and prevent flow of ambient air into said chamber when fluid pressure within said chamber falls below ambient pressure by a predetermined amount, means within said chamber for absorbing radiant solar energy for heating and expanding gaseous fluid material on the interior of said chamber, said first and second valve means being responsive to the expansion of gaseous fluid which occurs due to solar heating, and being further responsive to the contraction of gaseous fluid material which occurs during periods of cooling of the gaseous fluid material on the interior of said chamber.

4,051,770

VENTILATORS FOR MOBILE HOMES, AND THE LIKE

John V. Felter; Bill P. Taylor, Jr., and Kenneth M. Rudine, all of P.O. Box 7464, Houston, Tex. 77008

Filed Sept. 15, 1975, Ser. No. 613,088
Int. Cl.² F24F 7/06
U.S. Cl. 98—43 B **12 Claims**

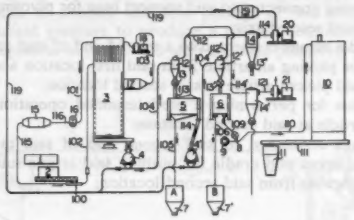


1. Ventilator apparatus comprising vertically disposed unitary tube means adapted for mounting through wall means, said tube means comprising an upper imperforate tubular portion and a lower imperforate tubular portion and an intermediate tubular portion formed of expanded sheet material in lattice form connected between said upper and lower tubular portions, said upper tubular portion being of plain tubular form throughout its length and being adapted to be trimmed at its upper end to reduce its vertical length to adapt to reduce thickness of said wall means, the upper end of said tube means comprising an air outlet and the lower end of said tube means and said intermediate tubular portion comprising air inlets, including a flash plate for engaging the upper surface of said wall means disposed freely around the upper end of said upper tubular portion and having an upstanding inner sleeve portion disposed around the upper end of said upper tubular portion, an outer tube engaged around said sleeve and extending upwardly therefrom, said flash plate and said outer tube preventing leakage around said ventilator apparatus at the upper surface of said wall means, said wall means including a roof and a ceiling and an attic space therebetween, said intermediate tubular portion being adapted to be positioned in said attic space, said lower end of said tube means having connection means adapted for connection to said ceiling, said upper end of said tube means being adapted to extend through said roof whereby air may be simultaneously ventilated from said attic space and from a room beneath said ceiling through said ventilator apparatus.

4,051,771
APPARATUS FOR OBTAINING LUPULIN-RICH PRODUCTS FROM HOPS

Junjiro Miyata, and Yasushi Kikuchi, both of Fukushima, Japan, assignors to Asahi Breweries, Ltd., Tokyo, Japan

Division of Ser. No. 669,872, March 24, 1976. This application June 30, 1976, Ser. No. 701,092
Claims priority, application Japan, Mar. 4, 1976, 51-23509
Int. Cl.[2] C12B *1/00*
U.S. Cl. 99—276 13 Claims



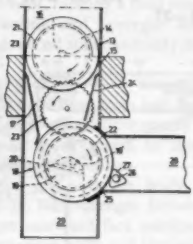
1. An apparatus for obtaining a lupulin-rich product from hop cones, which comprises: a storage tank for containing frozen hop cones, said storage tank having a feeder at the lower end thereof for feeding frozen hop cones from said storage tank; a first crusher connected for receiving frozen hop cones from said feeder, said first crusher having first crusher screen means whose openings are relatively large; a first cold air conveying pipe connected for receiving crushed fragments that pass through the screen means of said first crusher and for conveying said fragments in a cold air stream; a first cyclone connected to said first cold air conveying pipe for separating the cold air from the fragments; a first sieving device connected to said first cyclone for receiving said fragments that are discharged from said first cyclone, said first sieving device having first sieve screen means for separating the relatively large size fragments from the relatively small size fragments; a second crusher connected to said first sieving device for receiving therefrom the relatively large size fragments that are retained on said first sieve screen means and for re-crushing said relatively large size fragments, said second crusher having second crusher screen means whose openings are smaller than the openings of said first crusher screen means; a second cold air conveying pipe connected for receiving re-crushed fragments that pass through said screen means of said second crusher and for conveying said re-crushed fragments in a second cold air stream; a second cyclone connected to said second cold air conveying pipe for separating the cold air from the re-crushed fragments; and a second sieving device connected to said second cyclone for receiving said re-crushed fragments that are discharged from said second cyclone and having second seive screen means for separating the relatively large size re-crushed fragments from the relatively small size re-crushed fragments; said first and second cold air conveying pipes being part of a closed, cold air conveying system.

4,051,772
MACHINE FOR DISPENSING HEATED SAUSAGE FROM A COLD STORAGE COMPARTMENT

Reinhold A. Johnson, Ostra Hasselbacken 17, and Arne B. Svensson, Wilhelmsbergsvagen 8, both of 56100 Huskvarna, Sweden

Filed Dec. 9, 1975, Ser. No. 639,247
Claims priority, application Sweden, Dec. 9, 1974, 7415342; Sept. 19, 1975, 7510510
Int. Cl.[2] A47J *27/66*
U.S. Cl. 99—427 4 Claims

1. A device for treating and transporting sausages, farming part of a vending machine, comprising a roller having a recess therein to receive said sausage, said roller being rotatably mounted about a horizontal axis permitting said product to fall down by means of its own gravity into said recess when said roller is in a first angular position and in a second angular position of said roller the recess of said roller being so located that the product received therein is subjected to micro waves, a rotor means being provided to rotate the product in said

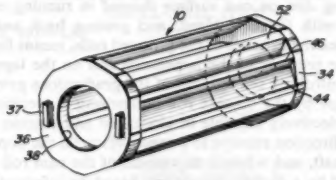


recess in said second angular position of said roller in order to rotate said product about its longitudinal axis, said recess of said roller in a third angular position of said roller being in register with an outlet opening through which the product leaves said roller by gravity.

4,051,773
MILLING ROLL

Lynn D. Staton, Rte. 1, Box 22 D, Stuttgart, Ark. 72160

Filed June 2, 1976, Ser. No. 692,234
Int. Cl.[2] B02B *3/02*
U.S. Cl. 99—622 5 Claims



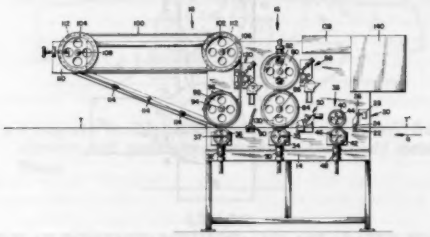
1. In a rice rolling machine having a frame supporting a stationary screen provided with a peripheral screen wall, a rotatable main shaft disposed centrally of said screen, an inlet at one end of the screen and an outlet at the other end thereof, a milling roll comprising a pair of longitudinally spaced end plates, a plurality of longitudinally elongated, spaced baffle plates rigidly interconnecting said end plates with the space between the baffle plates being open, each of said end plates being annular and including a large central opening receiving the main shaft of the rice milling machine, said baffle plates including a plurality of equally and circumferentially spaced first angled baffles having a radially inwardly inclined surface and an equal number of circumferentially spaced second arcuately curved baffles having a radially outwardly inclined surface, said first angled baffles serving to move rice kernels radially inwardly from the periphery of the milling roll and screen toward the main shaft during rotation of the milling roll and the second arcuately curved baffles serving to move rice kernels radially outwardly of the milling roll during rotation thereby rubbing the rice kernels together for removing the bran coating.

4,051,774

MACHINE FOR PRINTING MEASURING TAPES

Carl Kenneth Barnes, and John Owen Barnes, both of Suffield, Conn., assignors to Jack Barnes Engineering, Inc., Enfield, Conn.

Filed May 17, 1976, Ser. No. 687,107
Int. Cl.[2] B41F *17/10*
U.S. Cl. 101—37 1 Claim



1. A machine for printing long flexible measuring tapes comprising:

a first printing station for printing inch graduations on a tape blank in one color,

a second printing station for printing foot graduations and other indicia on the tape blank in a second color,

means for moving the tape blank linearly through the printing stations,

the first printing station comprising a master print roll,

a blanket roll and an impression roll,

the master print roll and blanket roll being in running engagement with each other and the blanket roll being in running engagement with the upper planar surface of the tape blank,

the impression roll being in running engagement with the lower planar surface of the tape blank and underlying the blanket roll, the second printing station comprising a perforated printing band entrained about a pin roll and about a pair of grooved rolls, the printing band having printing dies on one surface thereof in running engagement with the tape blank, and passing back and forth between the grooves of the grooved rolls, means for varying the pressure of the impression roll on the tape blank for controlling the spacing of the graduations printed on the tape by the blanket roll comprising a precision cam roll selectively rideable in clockwise and counter clockwise direction relative to a cam surface on the impression roll shaft, and wherein movement of the cam roll is controlled by a digital control unit based on information fed to said unit from an encoder wheel and a fiber optic control unit linearly spaced along the line of travel of the tape blank before and after the first printing station respectively for sensing and reporting graduation spacing, wherein one rotation of the encoder wheel is equal to one inch of linear travel of the tape blank, with each such rotation of the encoder wheel being reported to the digital control unit, and wherein the fiber optic control unit senses indicia printed at spaced intervals along the tape blank and reports to the digital control unit, which directs appropriate movement of the cam roll.

4,051,775

APPARATUS FOR AUTOMATICALLY POSITIONING WITH RESPECT TO A PREDETERMINED OPERATION STATION

Edward F. Watson, 28 Minton Ave., Chatham, N.J. 07928

Filed Oct. 23, 1975, Ser. No. 625,143
Int. Cl.[2] B23B *15/00;* B41F *17/08*
U.S. Cl. 101—38 A 8 Claims

1. An apparatus for transferring articles from a first location to a second location comprising:

a support base;

a crank mounted for rotation about a first axis;

means connected to said support base and said crank for driving said crank in rotation about said first axis;

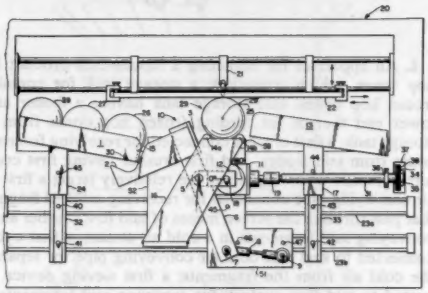
an elongated cradle arm pivotally connected at an intermediate point thereon to said crank at a first pivot point located a first predetermined distance from said first axis;

a rocker arm having two ends, one end being pivotally connected to a first end of said cradle arm at a second pivot point located a second predetermined distance from said first pivot point and another end of said rocker arm being connected to said support base for pivoting about a fixed second axis;

cradle means connected to a second end of said cradle arm for picking an article from said first location and placing said picked article at said second location;

means for performing a predetermined operation on said article at said second location;

means connected to said second end of said cradle arm adjacent said cradle for pushing said article substantially sidewise from said second location;



said drive means rotating said crank means to cause said first pivot point at said intermediate point of said cradle arm to move in a circular path and said second pivot point at said first end of cradle arm to oscillate about said fixed second axis, whereby said cradle moves along an orbital path passing through said first location to pick an article therefrom, transferring the article for placement at said second location, subsequently to said pushing means pushing an article previously placed at said second location from said second location and moving away from said placed article as said cradle returns toward said first location and said operation means performs said predetermined operation, feed supply means for supplying said article at said first position, discharge track means for providing a path for said placed article pushed from said second location, and said discharge track means being arranged directly adjacent and to one side of the second location so that the push means does not lift the article at all but merely pushes same sidewise to said discharge track means.

4,051,776

DOWNSTREAM WEB TENSIONING FOR ROTARY SCREEN PRINTER

Johannes Zimmer, Ebentaler Strasse 133, A-9020 Klagenfurt, Austria

Continuation of Ser. No. 450,854, March 13, 1974, abandoned.
This application Apr. 30, 1976, Ser. No. 682,174
Int. Cl.[2] B41F *15/24*
U.S. Cl. 101—118 5 Claims

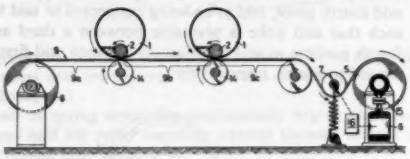
1. In an apparatus for printing a flexible web of material, particularly a web of paper material, such apparatus being of the type including positively driven magnetic rollers; first drive means for positively driving said magnetic rollers at a first speed; second driving means for driving a web of material from a supply over said magnetic rollers; and hollow perforated cylindrical printing stencils, one each positioned to

contact and print a first portion of said web opposite a respective of said magnetic rollers; the improvement wherein

said web is maintained substantially planar or flat in the area of contact with said cylindrical stencils;

said second driving means is positioned downstream of said cylindrical stencils and comprises means tending to drive said web in the same direction as said driven magnetic rollers, but at a second speed higher than said first speed;

pressure means, including doctor rolls of magnetically attractable material, one each positioned within a respective one of said cylindrical stencils, for causing said cylindrical stencils to contact said first portion of said web with sufficient pressure to produce a friction connection and engagement between said web and said positively driven



magnetic rollers, and for thereby reducing the speed of movement of said first portion of said web in the area of contact with said cylindrical stencils to said first speed of said magnetic rollers, thus tending to create a speed differential between said first portion of said web and a second portion of said web which is downstream of said cylindrical stencils and which is driven by said second driving means, whereby said second portion of said web downstream of said cylindrical stencils is tensioned;

said first driving means for driving said magnetic rollers being independent of said friction connection and engagement between said web and said magnetic rollers; and

means responsive to the tension thus created in said second portion of said web to reduce the speed of said second portion of said web.

4,051,777

STENCILLING APPARATUS WITH FLOW THROUGH PRINT AND FLOW ACTION

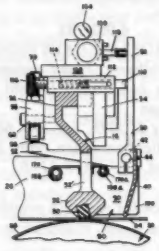
James A. Black, Kent City; Harry Russell Farwell, Cedar Springs, and Frank L. Porth, Morley, all of Mich., assignors to James A. Black, Kent City, Mich.

Continuation-in-part of Ser. No. 518,768, Oct. 29, 1974, Pat. No. 3,973,491. This application May 21, 1976, Ser. No. 688,610

The portion of the term of this patent subsequent to Apr. 10, 1993, has been disclaimed.

Int. Cl.[2] B41F *15/42*

U.S. Cl. 101—123 **2 Claims**



2. Stencilling apparatus comprising:

means for supporting stock to be stencilled;

means for supporting a stencil screen above said stock supporting means;

an upstanding squeegee having a body with forward face portion, a rearward face portion, and a lower resilient squeegee element for forcing fluid down through the stencil screen onto stock on said stock supporting means;

an upright flow coater panel having a lower edge;

means for supporting said flow coater panel in spaced relationship behind said upstanding squeegee relative to the direction of advancement, forming a fluid reservoir therebetween and for causing said squeegee and said flow coater panel to be advanced simultaneously during a stencilling stroke;

said flow coater panel lower edge being mounted relative to the stencil screen for fluid flow from said fluid reservoir beneath said lower edge of said flow coater panel when said flow coater panel is advanced, to flow coat said screen for the next stencilling stroke;

passage means through said squeegee body, above said squeegee element, from said squeegee forward face portion to said squeegee rearward face portion, for direct flow through said squeegee body and into said reservoir, of excess fluid on the screen forwardly of said squeegee when said squeegee is advanced, whereby simultaneous advancement of said squeegee and flow coater panel in a stencilling and flow coating stroke results in a stencil-and-flow function keeping the screen covered with fluid, a portion of the fluid ahead of said squeegee being forced down through said screen, and excess fluid is not forced through said screen being able to flow from ahead of said squeegee through said squeegee body into said reservoir, and a portion of the fluid in said reservoir being caused to flow from said reservoir beneath said flow coater lower edge onto the screen to flow coat the screen for the next stencilling stroke.

4,051,778

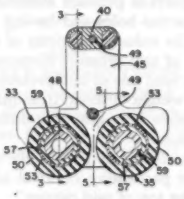
ROLLER DEVICE FOR USE WITH PRESSURE SENSITIVE DUPLICATING MASTER AND METHOD OF OPERATION

William D. Pflaum, and Mark E. Tullis, both of Dayton, Ohio, assignors to The Mazer Corporation, Dayton, Ohio

Filed June 28, 1976, Ser. No. 700,208

Int. Cl.[2] B41L *11/00*

U.S. Cl. 101—133 **6 Claims**



1. A device for use with a pressure sensitive duplicating master for applying a duplicating pressure to the master and a sheet of copy paper positioned with the master on a hard surface comprising:

first roller means of a predetermined hardness for applying pressure, said first roller means having a central axis about which it may be rotated,

second roller means, of a hardness less than said predetermined hardness, for applying pressure, said second roller means having a central axis about which it may be rotated, and

frame means for mounting said first and second roller means side by side with their respective axes substantially parallel and laterally displaced and for permitting pressure to be applied simultaneously with said first and second roller means, whereby the quality of the copy produced is not adversely affected by irregularities in the hard surface since both said first roller means and said second roller

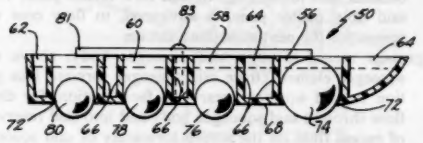
means apply duplicating pressure to all portions of the master and the sheet of copy paper.

4,051,779

PAPER REGISTRATION CONTROL DEVICE FOR PRINTING PRESSES

Robert N. Zaagman, Wyoming, Mich., assignor to MRC Manufacturing Co., Grand Rapids, Mich.

Filed May 27, 1976, Ser. No. 690,378
Int. Cl.[2] B65H *9/06, 9/14*
U.S. Cl. 101—242 **2 Claims**



1. A paper registration control device for use in a printing press of the type including a paper supporting surface over which paper is moved as it enters the press, forward head stops, a rigid bar overlying said feed surface, and a shiftable side guide block and which receives paper from a feed mechanism, said paper registration control device comprising:

an elongated, carrier member including spaced, parallel said members a transversely extending bottom member joining said side members and having an upwardly curved leading edge and a plurality of tandemly arranged holes extending vertically therethrough, each of said holes having an opening of reduced diameter where it opens through the bottom member of the carrier and the one of said holes closest to the leading edge having a diameter greater than the diameter of the remaining holes, said remaining holes being of equal diameter, said carrier member further defining an integral, downwardly opening slot extending longitudinally the entire length of said carrier, said slot being offset laterally from said tandemly arranged holes and dimensioned to receive the rigid bar of the press whereby the carrier is supported on said bar;

a plurality of spherical pressure elements, each disposed in one of said carrier holes and having a diameter slightly greater than the reduced diameter of said opening, a segment of each of said pressure elements projecting below the carrier, at least one of said pressure elements having a diameter and weight different from that of the others, said pressure elements arrangeable in different patterns along said carrier; and

guard means extending longitudinally of said carrier over said holes for preventing removal of said pressure elements from the top of said carrier.

4,051,780

LABEL FEED MECHANISM FOR PORTABLE LABELING MACHINES

Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed May 14, 1976, Ser. No. 686,562
Claims priority, application Japan, May 15, 1975, 50-054308
Int. Cl.[2] B41F *1/08;* **B41J** *1/08, 1/40*
U.S. Cl. 101—305 **9 Claims**

1. A portable labeling machine comprising:

a frame; means for supporting and dispensing a continuous strip of labels; said frame including a passage therethrough having an entrance positioned to receive a strip of labels dispensed from said supporting means therefor; said passage extending through said frame and being adapted for having a label strip pass through said passage;

a label strip feed mechanism is said frame comprising:

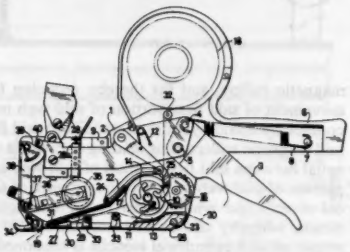
a first axis on said frame; a feed wheel mounted on said first axis for rotation around said first axis; said feed wheel having a periphery; said feed wheel being located so that said periphery engages and moves said strip of labels along and through said passage as said feed wheel rotates;

a drivable element; a second rotation axis carried on said frame; said drivable element being mounted on and being rotatable on said second axis;

a drive gear assembly joining and in engagement with said drivable element and with said feed wheel such that rotation of said drivable element rotates said feed wheel;

a third pivot on said frame; a lever pivotally attached to said frame at said third pivot; said lever being pivotable around said third pivot between a first and a second position of said lever;

a fourth pivot on said frame; a yoke pivotally supported on said fourth pivot; said yoke being connected to said lever such that said yoke is pivotable between a third and a fourth position as said lever pivots between said first and second positions, respectively;



a drive element connected to said yoke and movable therewith; said drive element being connected to said yoke at a location spaced away from said fourth pivot, thereby to permit translational motion of said drive element upon pivoting of said yoke; said drive element engaging said drivable element such that movement of said yoke causes said drive element to rotate said drivable element, and thereby to rotate said feed wheel through said drive gear assembly; the motion of said drive element that is caused by motion of said yoke between said third and fourth positions rotates said drivable element through a first angular distance;

said gear assembly including engaging gears shaped and dimensioned to create a gear ratio among them such that said feed wheel is rotated through a second angular distance, which is greater than said first angular distance, by movement of said yoke between said third and fourth positions.

4,051,781

INK ROLLER CARTRIDGE

Tatsuo Nishikawa, Tachikawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo and Canon Denshi Kabushiki Kaisha, Saitama, both of Japan

Filed May 3, 1976, Ser. No. 682,800
Claims priority, application Japan, May 28, 1975, 50-63887
Int. Cl.[2] B41F *31/30*
U.S. Cl. 101—348 **4 Claims**

1. An ink roller device for use with printing apparatus which includes a printing type drum, comprising:

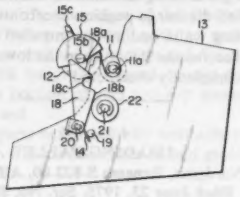
a shaft;

an ink roller, integral with said shaft, for contacting the printing type drum to apply ink thereto;

an ink roller cartridge for accommodating said ink roller and formed with an opening for exposure therethrough of said roller, said cartridge including a pair of side plates each having a portion rotatably receiving said shaft;

means for holding said shaft at said receiving portions after the shaft has been positioned therein;

a pair of levers for supporting said receiving portions, said levers each having a recess for receiving one of said receiving portions and having adjacent sides forming an acute angle at one end thereof for guiding one of said



receiving portions toward the open end of its respective recess and toward one of the sides of the printing type drum; and

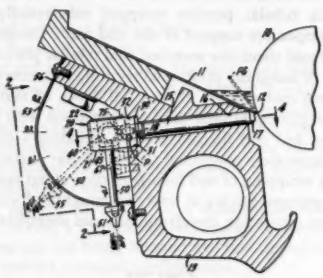
a pair of spring means for continuously urging said levers and said ink roller cartridge carried thereby toward the printing type drum.

4,051,782

DOSING DEVICE ON AN INK FOUNTAIN

Eloy Fernandez, Heusenstamm, Germany, assignor to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Germany

Filed Nov. 9, 1976, Ser. No. 740,106
Claims priority, application Germany, Nov. 12, 1975, 2550720
Int. Cl.² B41F *31/04*
U.S. Cl. 101—365 **5 Claims**



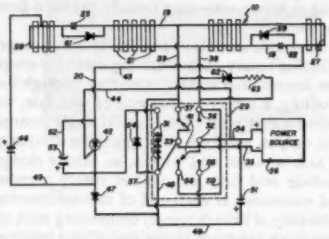
1. A mechanism for adjusting the blade of an ink fountain with respect to a fountain roller comprising, in combination, a frame, a plurality of zonal adjusting subassemblies spaced along the blade at equal intervals, each subassembly including a pin slidable in the frame at right angles to the edge of the blade, the pin having a tip and a rear end portion, the tip being positioned to engage the edge of the blade at an angle thereby to hold the blade closely spaced to the cylinder, a slide secured to the rear end portion of the pin and guided for sliding movement with respect to the frame, a rotatable adjusting member having an eccentric crank engaging the slide for positioning the same, the adjusting member further having an adjusting arm projecting radially therefrom, the arm having a calibrated scale including a reference mark fixed with respect to the frame, the adjusting member having a positive detent phased with the reference mark, the pin being threaded into the slide and the rear end of the pin being engageable by a turning tool so that when the adjusting arms are in detented reference position the blade may be preliminarily adjusted, zone by zone, into a reference spacing with respect to the roller by turning the pin in one direction or the other in each of the subassemblies, all of the reference marks and all of the scale graduations being in axial alignment with one another, the blade being finally and individually adjustable in each zone by movement of the corresponding arm with respect to its calibrated scale to establish a running condition.

4,051,783

MODEL RAILROAD LAYOUT

Frank Caliri, Marlboro, Mass., assignor to Peerless Industries Inc., Marlboro, Mass.

Filed July 1, 1976, Ser. No. 701,905
Int. Cl.² B61B *13/00*
U.S. Cl. 104—151 **7 Claims**



1. Model railroad layout for use with a direct current motor-driven engine, comprising

a. a track having a finite length and consisting of two parallel rails, one rail having a switching means consisting of a gap in the rail adjacent one end of the track and the other having a switching means adjacent the other end of the track,

b. a source of direct current electrically connected to the track, one rail being connected to ground and the other rail to the positive voltage side, so that current passes from one rail, through a wheel of the engine, through its motor, and through another wheel to the other rail, and

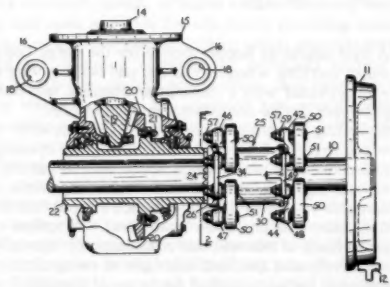
c. control means to switch the polarity of the electricity applied to the rails to reverse the direction of the motion of the engine when it approaches a switching means, the control means reversing the engine when a wheel passes over a gap and electrically connects the rail on both sides of the gap.

4,051,784

FLEXIBLE ROTARY COUPLING

Donald Lloyd Ries, Dearborn Heights, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Apr. 12, 1976, Ser. No. 676,087
Int. Cl.² F16D *3/04, 3/62*
U.S. Cl. 105—131 **8 Claims**



1. A coupling for transmitting torque from a rotary driving means to a rotary driven means comprising a first member adapted to be connected to said driving means, a second mem-

ber adapted to be connected to said driven means, an elongate member intermediate said first and second members and means drivingly connecting said first and second members respectively to opposite ends of said intermediate member, said means connecting at least one of said members to its respective end of said intermediate member comprising a plurality of links and connecting pins with each link having a pair of connecting pins with one end of each connecting pin seated within said link and with the pins extending in one direction away from said link with one connecting pin of each link secured adjacent its other ends to means extending radially outward from said one member and the other connecting pin secured adjacent its other end to means extending radially outward from said intermediate member.

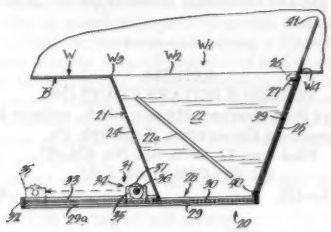
6. A drive axle assembly for a rail vehicle comprising a gear box including rotary output driving means, a coupling having a hollow interior and an axle extending through the interior of said coupling, a wheel at each end of said axle, said coupling comprising a first rotary member drivingly connected to said gear box output, a second rotary member drivingly connected to said axle between said wheels, an axially elongate member intermediate said first and second rotary members, radially directed extensions at each end of said intermediate member, and a plurality of links drivingly connecting each of said rotary members to an extension at one end of said intermediate member, each of said links being located on the side of its respective extension opposite from said first rotary member and including a pair of connecting pins projecting axially away from said link in the direction of said first rotary member, one of said pair of connecting pins being secured adjacent its projecting end to an extension of said intermediate member and the other of said pair of connecting pins being secured adjacent its projecting end to one of said rotary members.

4,051,785

DUAL DISCHARGE HOPPER DEVICE FOR BULK CARGO VEHICLES

Richard P. Bessette, 13029 S. Hoyne Ave., Blue Island, Ill. 60406

Filed June 1, 1976, Ser. No. 691,465
Int. Cl.² B61D *7/06*
U.S. Cl. 105—280 **18 Claims**



1. A dual discharge hopper device for the cargo body of a bulk cargo carrying wheeled vehicle, said body having a bottom wall provided with a rectangular opening, said dual discharge hopper device comprising, in combination:

a depending structure having two fixed sidewalls which bound first parallel sides of said rectangular opening, and two connecting walls which bound second parallel sides of said opening, one of said connecting walls being mounted on a pivot the axis of which extends between the fixed sidewalls immediately adjacent the bottom of the cargo body so that said one of said connecting walls may selectively abut the fixed sidewalls or swing clear of said sidewalls for uncontrolled discharge of material from the cargo body;

controlled discharge closure means at the lower end of said depending structure;

discharge control means for moving said controlled discharge closure means to any desired point between a closed position in which it completely blocks the lower end of the structure and a fully open position in which said lower end is effectively unobstructed;

and a diverter panel mounted on a horizontal shaft that extends between the lower ends of the sidewalls immediately adjacent said one of said connecting walls, said diverter panel being movable between a generally upright controlled discharge position confronting said one of the connecting walls, and an uncontrolled discharge position inclined across the structure so the lower end of the structure is completely obstructed.

4,051,786

LOADING PALLET

Hans-Elov Nordgren, Runemo S-822 00, Alfta, Sweden

Filed June 23, 1975, Ser. No. 589,630
Int. Cl.² B65D *19/40*
U.S. Cl. 108—51.1 **1 Claim**

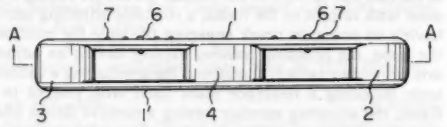
1. A support comprising a sheet-like member defining a supporting surface, a plurality of supports underlying said sheet-like member, and a securing member individually securing each support to said sheet-like member, each support being generally circular in peripheral outline, and each securing member formed of readily bendable sheet metal and including a one-piece tubular portion wrapped substantially entirely around a respective support at one end and a flanged portion secured to said sheet-like member, said tubular portion having a plurality of integrally preformed securing elements extending radially into said support for the full depth of said securing elements beginning at their lines of connection with said tubular portion, and said flanged portion including a plurality of segments separately connected to said tubular portion thereby permitting wrapping of said tubular portion about said support, and each segment having at least one integrally formed securing element projecting therefrom into said sheet-like member.

4,051,787

PLASTIC PALLET

Kiyoshi Nishitani, Yokohama; Ryuzo Ebina, Tokyo; Ikuo Sukekawa, and Shuji Shintani, both of Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Sept. 29, 1975, Ser. No. 617,788
Claims priority, application Japan, May 6, 1975, 50-54044; May 20, 1975, 50-59935
Int. Cl.² B65D *19/44*
U.S. Cl. 108—55.3 **12 Claims**



1. A pallet for a fork lift structurally comprising:

two mating component parts of thermoplastic resin wherein each of said components parts comprises a deckboard having inner and outer surfaces and girders integrally formed on said inner surfaces with at least one girder being disposed along each of the side edges of said deckboard and along a line intermediate and parallel to the side

edges so as to define fork lift insertion openings therebetween,

at least one of said component parts being provided with numerous ribs, integrally formed on the inner surface of said deckboard, which are lower in projection than said girders and which in areas not covered by said girders are disposed decreased distances from one another in the neighborhood of the side edges of the deckboard,

said deck board being provided with an anti-slip means having an upper and lower portion and fitted into a hole penetrating a rib integrally formed on said deckboard so that the lower portion of said anti-slip means protrudes from said rib, and

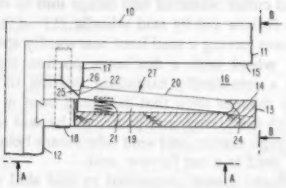
said component parts being mutually melt adhered together at the respective bottom surfaces of said girders.

4,051,788

FOLDING TABLE

William E. Gindele, East Boothbay, Maine 04544

Filed Apr. 20, 1976, Ser. No. 678,688
Int. Cl.² A47B 3/00
U.S. Cl. 108—125 **4 Claims**



1. In a table having folding legs:

a top, a frame of side rails,

a further rail attached to said top associated with each corner formed by said side rails, having a wall facing an opposing wall of one of said rails which creates a channel for receiving a leg when in its folded position,

pivot means attaching each leg to the table having an axis perpendicular to the opposing walls of said further rail and one of said side rails;

locking means comprised of a substantially rectangular block having a leg bearing end and an opposite end, said leg bearing end being beveled and said opposite end having a convex rounded configuration,

a recess in said further rail, said recess being configured in a substantially rectangular shape and includes a concave, rounded end for receiving said convex, rounded end of said locking means to thereby provide a pivot point for said locking means, and retain said locking means within said recess when said leg is in its folded position, and

means to force said locking means towards said opposing wall of said side rail.

4,051,789

WALL FIXTURE

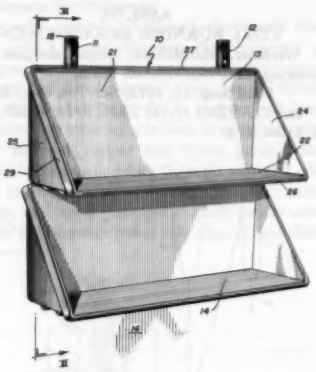
Robert T. Howitt, Leominster, Mass., assignor to Frem Corporation, Worcester, Mass.

Filed July 22, 1976, Ser. No. 707,669
Int. Cl.² A47B 5/00
U.S. Cl. 108—152 **10 Claims**

1. Wall fixture, comprising:

a. a pair of rails adapted to be mounted on a wall in spaced, parallel relationship, each rail being formed with a plurality of inclined slots, and

b. an appliance extending between the rails, the appliance having a main body with a surface facing the rails and having a horizontally-extending fin extending from the surface and lying in a slot of each of the rails, each of the fins having a tapered cross-sectional shape and being wider adjacent the wall from which it extends than at the portion more remote from the wall, the shape of the slots



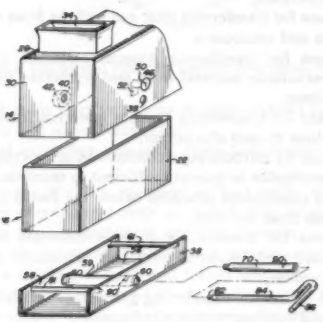
and the cross-sectional shape of the fin being substantially the same.

4,051,790

VEHICLE SAFE

William F. Meditz, 6821 E. Thornapple Drive, Mayfield Village, Ohio 44040, and James V. Congin, 5717 Wilson Mills Road, Highland Heights, Ohio 44143

Filed May 20, 1976, Ser. No. 688,412
Int. Cl.² E05G 1/00
U.S. Cl. 109—58 **6 Claims**



1. An enclosure having an access member movable between closed and open positions for selectively providing access to said enclosure, first releasable locking means movable between locking and releasing positions for releasably locking said access member in said closed position, said first releasable locking means including key operated first release means located within each enclosure for releasing said first releasable locking means, a limited access opening in a wall of said enclosure for providing limited access to said first release means by a key, second releasable locking means having key operated second release means accessible externally of said enclosure and including blocking means selectively movable between blocking and unblocking positions for selectively blocking and unblocking access through said opening to said first release means, said first locking means further including an enlongated hollow member extended through said limited access opening and having inner and outer ends, said first release means being located at said inner end of said hollow member, said hollow member having a transverse opening therein, and said blocking means being movable transversely of said hollow member into

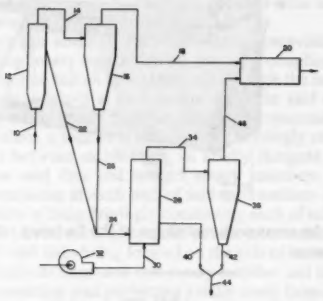
and out of said transverse opening in moving respectively between said blocking and unblocking positions.

4,051,791

COAL BURNING ARRANGEMENT

Alex F. Wormser, Marblehead, Mass., assignor to Wormser Engineering, Inc., Marblehead, Mass.

Filed Aug. 15, 1975, Ser. No. 604,923
Int. Cl.² F23D *19/00*; F23C *5/16*; F23D *1/00*
U.S. Cl. 110—28 R **20 Claims**



1. Coal burning apparatus which comprises, in combination:
a spouted fluidized bed pyrolyzer,
a fluidized bed combustor,
a first cyclone,
a second cyclone, and
an afterburner,
means for introducing pulverized coal and sorbent into said pyrolyzer,
means for transferring char and sorbent from said pyrolyzer to said combustor,
means for transferring gaseous materials with entrained particulate material from said pyrolyzer to said first cyclone,
means for transferring gaseous materials from said first cyclone to said afterburner,
means for introducing a combustion supporting gas into said combustor in quantity sufficient to maintain a temperature of combustion products below the fusion temperature of ash from the char,
means for transferring gaseous materials with entrained particulate material from said combustor to said second cyclone,
and means for transferring gaseous materials from said second cyclone to said afterburner.

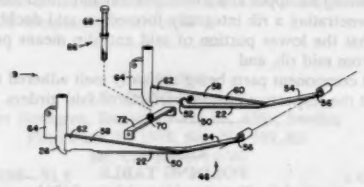
9. The method of burning coal which comprises the steps of
introducing pulverized coal and sorbent into a fluidized bed pyrolyzer,
carrying out in said pyrolyzer a reaction to produce char, desulfurized volatiles, and sulfur-bearing sorbent containing sulfur taken from said volatiles,
separating the char and sorbent from the desulfurized volatiles,
introducing the char and sulfur-bearing sorbent into a fluidized bed burner,
introducing into the burner a stoichiometric excess of air, said excess of air being chosen to produce an ash temperature below the fusion temperature thereof,
burning the char in contact with the sulfur-bearing sorbent and in heat-transfer relationship with the stoichiometric excess of air,
forming thereby dry ash, a desulfurized mixture of gases, and sorbent-bearing sulfur in increased amount,
separating said mixture of gases from said ash, and
burning said desulfurized volatiles in said desulfurized mixture of gases.

4,051,792

STRUCTURAL ORIENTATION AND PROTECTIVE APPARATUS FOR TILLAGE ASSEMBLY

Henry William Brandt, Jr., Des Moines, and Donald Thomas Sorlie, Ankeny, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jan. 15, 1976, Ser. No. 649,278
Int. Cl.² A01C *5/00*
U.S. Cl. 111—85 **8 Claims**



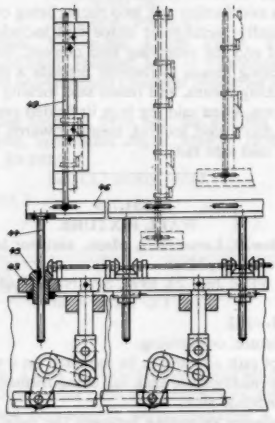
1. In a tillage unit having a cutter wheel mounted thereon, a structural orientation and protective apparatus, comprising:
skid means mounted on the unit independently of and adjacent to said cutter wheel of said tillage unit to control the depth of a furrow cut by said wheels;
seed tube means having a seed boot rearwardly spaced from the cutter wheel with a discharge portion rigidly connected to a rearwardly extending portion of said skid means in a manner such that said seed boot is vertically aligned with the furrow and protected by said skid means against foreign matter, said seed tube means being adapted to deposit seed in a cut furrow; and
depth adjustment means connected to said skid means for selectively adjusting the depth of furrow cut by vertically adjusting the cutter wheel and skid means relative to one another while said discharge portion of said seed boot is maintained in substantially the same relative position with respect to the ground level regardless of the selected depth of furrow cut.

4,051,793

EMBROIDERY MACHINE

Rudolf Reich, Neuwied, Germany

Filed Mar. 9, 1976, Ser. No. 665,343
Int. Cl.² D05C *3/04*
U.S. Cl. 112—83 **22 Claims**



1. An embroidering machine having a plurality of embroidering stations containing embroidering tools, said machine comprising:

embroidering heads, in which the embroidering tools of each embroidering station are combined on the needle side,

casings for the embroidering tools on the shuttle side,

basic guides, which extend over the height of the embroidery field and to which the embroidering heads and the casings are mounted,

adjustment bars mounted to the basic guides at the needle side and at the shuttle side for supporting the embroidering heads,

girders connecting the basic guides at the needle side and at the shuttle side for synchronously adjusting the embroidering tools of each embroidering station at the needle side and at the shuttle side, and

driving means for moving the adjustment bars with respect to the basic guides.

4,051,794

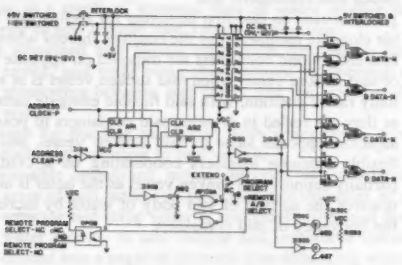
AUTOMATIC SEWING MACHINE

William P. Herzer, High Bridge, N.J., and Robert E. Cullen, Norwood, Mass., assignors to Union Special Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 496,748, Aug. 12, 1974, Pat. No. 3,982,491. This application July 3, 1975, Ser. No. 592,951

Int. Cl.² D05B *21/00*

U.S. Cl. 112—121.12 **41 Claims**



1. An automatic sewing machine, comprising:

memory means having a plurality of randomly addressable storage locations, said storage locations having a plurality of information bits defining a plurality of separate data banks with said storage locations sharing bits in separate banks;

address means for selecting said storage locations;

means for separately selecting any of said data banks of the selected storage locations and excluding at least one unselected bank at the start of a sewing sequence;

means for reading information from the selected data bank of the selected storage locations and for generating signals representing the read information; and

means responsive to said signals corresponding to the selected bank for forming a stitch pattern in a work piece.

4,051,795

CLOTH GUIDE MECHANISM IN A SEWING MACHINE

Tadashi Kotsuka, Hino, and Torao Ohchi, Chofu, both of Japan, assignors to Tokyo Juki Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 16, 1968, Ser. No. 762,231

Claims priority, application Japan, Sept. 23, 1967, 42-61139

Int. Cl.² D05B *35/10*

U.S. Cl. 112—153 **8 Claims**

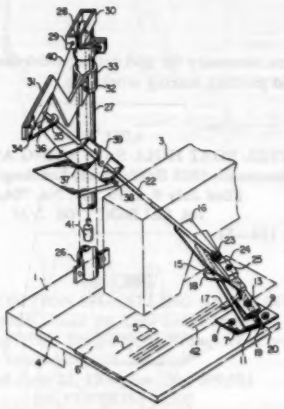
1. A sewing machine cloth guide mechanism of the type wherein a cloth is fed downwardly and in a first direction away from a sewing area of the sewing machine from a position above the sewing machine, the cloth is folded along one side edge thereof, and the cloth is then fed in a second direction over a needle plate of said sewing machine and through the sewing area while a seam is sewed in the cloth in a direction parallel to said second direction and parallel to the folded side edge, said cloth guide mechanism comprising:

a first guide member extending over the needle plate with a first clearance therebetween;

a second guide member positioned above said first guide member with a second clearance therebetween;

said cloth passing through said second clearance when being fed in said first direction, and then passing through said first clearance when being fed in said second direction;

a cloth positioning member attached to said first guide member and including upper and lower guide pieces, said lower guide piece extending through said first clearance, and said upper guide piece extending through said second clearance, said upper and lower guide pieces comprising means for guiding the folded side edge of said cloth while



said cloth is fed in said first and second directions, respectively;

said second guide member having an edge inclined to a line normal to said second direction;

a guide rod extending upwardly from said second guide member;

gripping means, slidably mounted on said guide rod, for resiliently gripping said cloth as it is led from the position above the sewing mechine in said first direction;

the feeding of said cloth in said second direction exerting a first force tending to urge said folded side edge of said cloth against said upper and lower guide pieces; and

means, connected to said gripping means, for urging said gripping means upwardly along said guide rod and for thereby exerting a second force opposing said first force on said cloth.

4,051,796

METHOD OF BREAKING UP SHIP HULL

Mitsuo Itani, Chiba; Hiroyuki Kawashima, Yokohama; Takasuke Inoue, Kunitachi, and Mikio Maruyama, both of Tokyo, all of Japan, assignors to Mitsui Engineering & Shipbuilding Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1977, Ser. No. 766,020

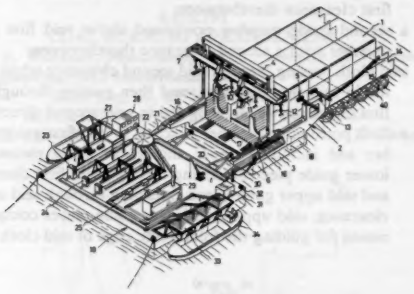
Claims priority, application Japan, Mar. 18, 1976, 51-29615; Mar. 18, 1976, 51-29616; Mar. 18, 1976, 51-29617

Int. Cl.² B63B *35/44*; B63C *7/00*

U.S. Cl. 114—44 **4 Claims**

1. A method of breaking-up a ship hull characterized by utilizing a cutting workshop having its own buoyancy and a product making workshop connected to said cutting workshop and having its own buoyancy, drawing a hull to be broken up into said cutting workshop and breaking up said hull, transfer-

ring the obtained broken-up objects to said product making workshop where said objects are worked into given products,



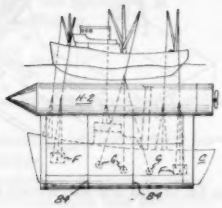
power etc. necessary for said cutting workshop being supplied from said product making workshop.

4,051,797

STEEL BOAT HULL SALVAGING ASSEMBLY

Erich Hausmann, 1025 S. Westlake, Los Angeles, Calif. 90006

Filed July 9, 1976, Ser. No. 704,058
Int. Cl.[2] B63C *7/08, 7/18*
U.S. Cl. 114—51 **2 Claims**



1. In combination with a salvage vessel that has a source of electric power thereon, a plurality of power operated cables movably supported in depending positions from said salvage vessel and capable of being raised and lowered relative thereto, and a plurality of power operated electrical inducing conduits depending from said salvage vessel that may be raised and lowered relative thereto, an assembly for raising a sunken vessel having a steel hull, said assembly including:

a. a closed circuit television system operatively associated with said salvage vessel said system including a waterproof camera supported from a first of said conduits, said camera capable of being lowered by one of said conduits to a position adjacent said sunken vessel to view the latter from said salvage vessel;

b. electric motor driven means supported by a plurality of said cables and powered through one of said conduits for removing foreign material from said steel hull when in pressure contact with said foreign material;

c. magnetic means for moving said electric motor driven means towards said hull to clean said foreign material therefrom and provide a plurality of clean spaced areas on said hull; and

d. a plurality of fastening assemblies that may each be lowered by a plurality of said cables to positions adjacent said cleaned areas, each of said fastening assemblies including:

1. a heavy steel plate secured to at least one of said cables;

2. an electromagnet removably secured to said plate, said electromagnet in communication with one of said conduits, and said plate being magnetized when said electromagnet is energized;

3. a plurality of transversely disposed fastening members mounted on said plate and capable of moving a distance less than that of their length relative to said plate;

4. a plurality of electrically detonable explosive charges on said plate which when exploded drive said members partially into said hull when said plate is held in abutting contact with said hull by said plate being magnetized; and

5. switching means connected to said conduit, electromagnetic and explosive charges for first energizing said electromagnet with electric power from said conduit, second for directing electric power to said explosive charges to detonate the latter and third de-energizing said electromagnet to permit the latter to be separated from said plate and drawn aboard said salvage vessel by use of one of said cables attached to said electromagnet, and said sunken vessel being raised when said cables attached to said plates are tensioned and moved upwardly to raise said sunken vessel to the surface of the body of water on which said salvage vessel floats.

e. first and second elongate containers of variable buoyancy that include remote controled power means for driving said first and second containers in laterally spaced relationship through the body of water on which said salvage vessel float;

f. a plurality of flexible elongate members that extend between said containers; and

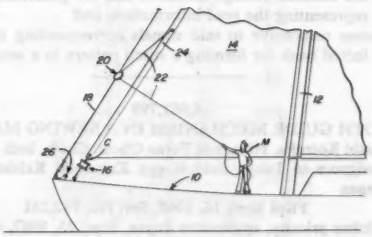
g. power means on said first container for reeling said flexible elongate members into the confines thereof when said first and second containers are disposed on opposite sides of said sunken vessel when said sunken vessel is in a partially raised position, with said flexible elongate members as they are reeled in drawing said containers to positions adjacent opposite sides of said sunken vessel, and said flexible elongate members cooperating on a cradle to partially support said sunken vessel as the latter is moved towards the surface of said body of water by increasing the buoyancy of said containers.

4,051,798

SELF-LOCKING CABLE TROLLEY

Mark W. Wade, West Palm Beach, and Donald A. Goodrum, Delray Beach, both of Fla., assignors to James Nemec, West Palm Beach, Fla., by said Donald A. Goodrum

Filed Apr. 13, 1976, Ser. No. 676,544
Int. Cl.[2] B63B *21/08*
U.S. Cl. 114—199 **10 Claims**



10. A self-locking cable trolley, comprising, in combination:

a. a length of a working line connected directly to the luff fo a jib sail for permitting sag in the sail to be drawn up to a head stay cable associated with the jib; and

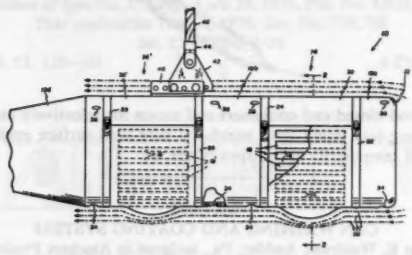
b. guide means mounted on the head stay cable for receiving the length of working line and permitting the working line to draw the luff of the sail up to the head stay cable.

4,051,799

RADIAL DEPRESSOR

Albert E. Wallen, Winston Salem, and Paul L. Whitehead, Burlington, both of N.C., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 28, 1976, Ser. No. 700,675
Int. Cl.[2] B63B *21/00*
U.S. Cl. 114—244 **7 Claims**



1. A vehicle adapted to be towed in a submerged state through a body of water and to generate vehicle depressing forces as a result of apparent flow of water relative to the exterior of said vehicle, said vehicle comprising:

an elongated hull having rigid walls defining an interior cavity, said walls being characterized by openings communicating between said cavity and the exterior of said walls;

means for flooding said cavity with water that is substantially static relative to said vehicle;

distensible membrane means disposed at predetermined areas of said walls and overlying said openings so as to separate said static water in said cavity from said flow of water relative to said vehicle and responsive thereto to distend into a negative pressure zone enhancing waterfoil; and

said membrane means having its maximum distension confined to the lower regions of said hull, whereby the resultant of radial forces acting radially about said hull is a depressing force urging said vehicle to sound.

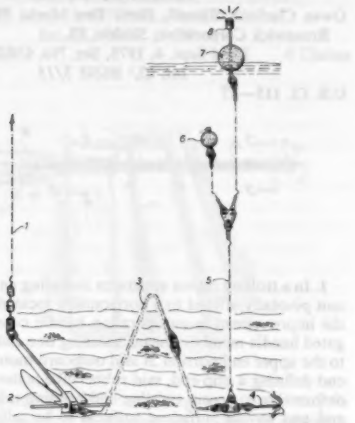
4,051,800

ANCHOR-WIRE ARRANGEMENT

Lars Farstad, Heimstadvn. 7, 7000 Trondheim, Norway

Filed Mar. 30, 1976, Ser. No. 671,958
Int. Cl.[2] B63B *21/24*
U.S. Cl. 114—297 **3 Claims**

1. Arrangement of the pendant wire or chain for an anchor, where the pendant wire or chain is at one end fastened to the anchor head and is used for pulling loose and drawing up the anchor, a line with a smaller diameter than that of the pendant wire or chain and having one end fastened to the other end of the pendant wire or chain, which line has a length which is at least equal to the depth of the water at the anchoring location, a buoy fastened to the other end of the line, and a further anchor, lighter than the first-mentioned anchor, between said other end of the pendant wire or chain and said one end of said line.

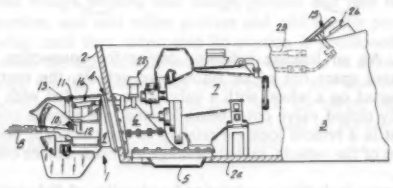


4,051,801

DRIVE POSITION SIGNALLING APPARATUS

William L. Woodfill, Fond du Lac, and Edward F. Ginnow, Omro, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed June 23, 1976, Ser. No. 699,081
Int. Cl.[2] B63M *11/00*
U.S. Cl. 115—12 R **17 Claims**



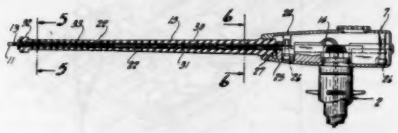
1. A sensing apparatus for sensing the angular positioning of a pivotally mounted marine drive unit including a power positioning means, said power positioning means having a position related means having a precise degree of movement between first and second limits in positioning of the marine propulsion means between two opposite limit positions, comprising an electrical transducer means having a mechanical input means and movable between two opposite limit positions, means for mounting said transducer means with the mechanical input means located in parallel spaced relation to said position related means, a clutch means having a first clutch element secured to said mechanical input means and a second clutch element secured to said position related means, said first and second clutch elements extending from said mechanical input means and from said position related means and including constantly overlapping portions resiliently and frictionally engaging each other to position the transducing means in accordance with the power positioning means and permitting relative slipping motion of the elements with the mechanical input means in one of said opposite limit positions as the position related means moves to said first or second limit positions.

4,051,802

OPERATING HANDLE FOR PIVOTALLY MOUNTED TROLLING MOTOR

Owen Clarkson Russell, Butte Des Morts, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Sept. 4, 1975, Ser. No. 610,308
Int. Cl.² B63H 5/13
U.S. Cl. 115—17 **9 Claims**



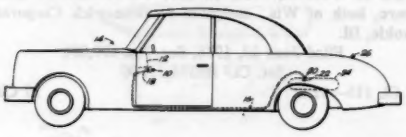
1. In a trolling motor apparatus including an outboard motor unit pivotally affixed to a horizontally located swivel bracket, the improvement in an operating handle comprising an elongated handle member, means securing one end of said member to the upper end portion of said outboard motor with the outer end defining a grip end, said rubber-like material being readily deformable to permit twisting and bending relative to said grip end and having sufficient stiffness to be self-supporting, and control cables extend through said handle.

4,051,803

AIR LEAKAGE INDICATOR DEVICE FOR A SPARE TIRE

Charles V. Arnone, 848 Brickell Ave., Miami, Fla. 33131

Filed Sept. 9, 1976, Ser. No. 721,701
Int. Cl.² B60C 23/04; G01D 13/04
U.S. Cl. 116—34 R **6 Claims**



1. An air leakage indicator device for connection to an inflated spare tire of an automotive vehicle, the spare tire, mounted on a wheel with a valve stem provided with a normally closed valve core, being located in a storage compartment in a remote location relative to the passenger compartment of the vehicle, said air leakage indicator device comprising,

means including a pointer and a plurality of dial sections to indicate to a person in the passenger compartment of the automotive vehicle if the air pressure in the spare tire is or is not within a safe range for emergency use thereof,

attachment means removably fixed to the outer end portion of the valve stem of the spare tire, including means on a connection portion of the attachment means and connected to actuate the normally closed valve core of the valve stem to an open condition,

connecting means comprising a flexible air conduit having first and second end portions, fixedly connected at said first end portion to said valve stem attachment means and at said second end portion to said indicating means.

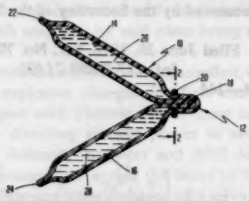
4,051,804

THAW-INDICATOR DEVICE

Merrill Garnett, East Islip, N.Y., assignor to Garnett-McKeen Chemical Corporation, East Islip, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,533
Int. Cl.² G01K 11/00
U.S. Cl. 116—114.5 **4 Claims**

1. An improved thaw-indicating device for frozen articles comprising an elongate transparent elastomeric tube folded into a V shaped to define first and second discrete closed end liquid containers separated by liquid tight interfacial engagement of the interior tube wall surfaces at the apex of the V, first and second liquid dyes for producing a contrasting color upon intermixture thereof selectively contained in said first and



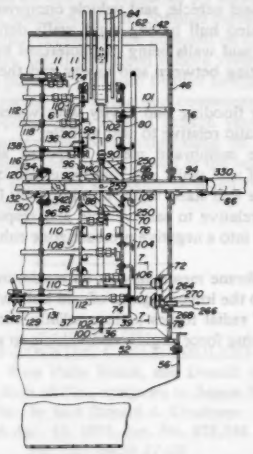
second closed end containers and means for selectively maintaining said liquid tight interfacial tube wall surface engagement temporarily at the apex of the V.

4,051,805

CAN WASHING AND COATING SYSTEM

John E. Waldrum, Ambler, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

Filed Nov. 11, 1975, Ser. No. 630,822
Int. Cl.² B05C 7/02
U.S. Cl. 118—58 **23 Claims**



1. Apparatus for spraying the surface of a plurality of open, cylindrical containers with a fluid at a high rate of speed, each of said containers having a side wall encircling the longitudinal axis of the container and an end wall at one end of said side wall, said apparatus comprising an enclosed housing, hollow carrier means disposed within said housing for receipt of said containers, a stationary raceway disposed about the periphery of said carrier means, said carrier means being rotatable about a first axis for carrying said containers from an inlet location in said housing through a circular orbit about said first axis to an outlet location in said housing, said containers making contact with said raceway to cause said containers to rotate on their respective axes as they move along said orbit, first spraying means including plural heads for spraying a fluid therefrom, each of said heads arranged to reciprocate into and out of a respective one of said open containers as said containers traverse said orbit to spray the interior surface of said side wall and said end wall, second spraying means mounted within said housing and arranged to spray said fluid in a radial direction with respect to said first axis and along a major portion thereof to spray the exterior surface of said side wall and third spraying means stationarily mounted within said housing and ar-

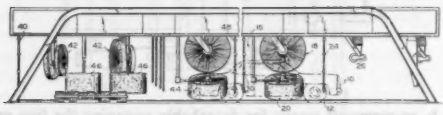
ranged to spray said fluid along a portion of the length of said orbit to spray the exterior surface of said end wall.

4,051,806

APPARATUS FOR WAXING CARS

Daniel C. Hanna, 1133 SW. Rivington Drive, Portland, Oreg. 97201

Division of Ser. No. 572,093, April 28, 1975, Pat. No. 4,015,032.
This application Nov. 4, 1976, Ser. No. 738,738
Int. Cl.[2] B05B 7/26
U.S. Cl. 118—63 4 Claims



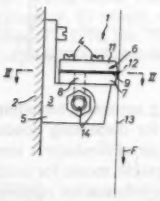
1. In an apparatus for waxing cars,
foam wax nozzle means for spraying a foamed mixture of wax and water onto a car to form a layer of foam on the car,
means for brushing the foam layer to polish the wax onto the car and remove most of the water therefrom,
second nozzle means for directing streams of a second mixture of self-polishing sealing wax and water onto the polished wax coating on the car, and
means for blowing air onto the car to remove excess of the second mixture from the car, the brushing means being interposed between the foam wax nozzle means and the blower means so that the air from the blower means does not blow the foam off the car.

4,051,807

APPARATUS FOR APPLYING PREPARATION AGENTS TO A BUNDLE OF FILAMENTS

Felix Graf, Winterthur, and Louis Moser, Hettlingen, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Mar. 22, 1976, Ser. No. 669,466
Claims priority, application Switzerland, Apr. 3, 1975, 4217/75
Int. Cl.[2] B05C 3/00, 3/12
U.S. Cl. 118—401 6 Claims



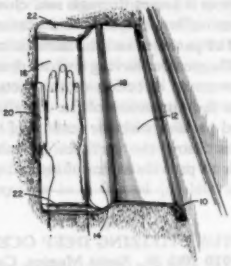
1. An apparatus for applying preparation agents onto a large filament bundle passing through in a substantially vertical direction, comprising an applicator head provided with a slit for applying the preparation agent and at least one guide edge for guiding the filament bundle, a supply duct for supplying the preparation agent to the slit, the applicator head embodying at least two oppositely situated surfaces forming the slit and the guide edge, said surfaces are provided at least at the region of the slit with a roughness assisting in the distribution of the preparation agent in the slit.

4,051,808

PAINT AND STAIN SHIELD

William Trupp, 901 Sandy Lane, Gastonia, N.C. 28052

Filed Mar. 11, 1977, Ser. No. 776,526
Int. Cl.[2] B05C 11/00
U.S. Cl. 118—504 6 Claims



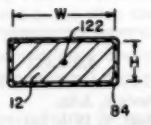
1. A paint and stain shield for shielding the edges of carpets or the like while painting or staining the bottom of adjoining walls, said paint and stain shield comprising:
a. a substantially planar and substantially rectangular lip portion of sheet-like material,
b. a substantially planar and substantially rectangular bridge portion of sheet-like material extending from said lip portion along one of the long edges thereof;
c. a substantially planar and substantially rectangular reflex portion of sheet-like material extending from said bridge portion along an edge opposite to the edge adjoining said lip portion; and
d. a substantially planar and substantially rectangular handle portion of sheet-like material extending from said reflex portion along an edge opposite to the edge adjoining said bridge portion, the angles between said lip portion and said bridge portion, said bridge portion and said reflex portion, and said reflex portion and said handle portion being such that, when said lip portion is positioned between the edge of a carpet and the bottom of an adjoining wall, the line joining said reflex portion and said bridge portion is close to, but does not touch, the carpet and no portion of the paint shield other than said lip portion and said handle portion touches the carpet.

4,051,809

APPARATUS FOR CLEANING AND COATING AN ELONGATED METALLIC MEMBER

Frank R. Zickar, and Paul Voytik, both of Sharon, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 22, 1976, Ser. No. 725,215
Int. Cl.[2] B05B 5/02
U.S. Cl. 118—630 17 Claims



4. Apparatus for applying an insulating coating on an elongated, continuously moving, metallic member having planar surfaces which define a substantially rectangular cross-sectional configuration in which the width dimension exceeds the height dimension, comprising:
a coating chamber,
a bed of finely divided, heat fusible particles of electrical insulating material in said coating chamber,

means providing a cloud of electrostatically charged particles above said bed,

means for moving the metallic member through said cloud of particles, with the planar surfaces which define the narrower height dimension being oriented parallel with the surface of the bed of particles,

means for electrically grounding the metallic member to cause said charged particles to deposit on the metallic member as it passes through said cloud,

at least one baffle member in said coating chamber between the bed of particles and the metallic member, said at least one baffle member having a width dimension transverse to the movement direction of the metallic member which exceeds the dimension of the metallic member which is oriented parallel with the surface of the bed of particles,

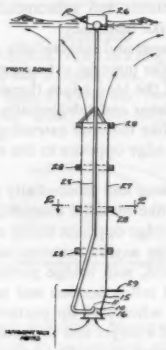
and means fusing the particles deposited on the metallic member to provide a film of insulating material thereon.

4,051,810

APPARATUS UTILIZING DEEP OCEAN NUTRIENTS

Paul Breit, 910 10th St., Santa Monica, Calif. 90403

Filed Nov. 17, 1975, Ser. No. 632,512
Int. Cl.[2] A01K *61/00*
U.S. Cl. 119—3 **9 Claims**



1. A floating apparatus for establishing a nutrient strengthened photic zone in a surrounding area of the ocean and including; a vessel adapted to float at the ocean surface, a member depending from the vessel and its lower end extending into the underlying nutrient rich waters, lift means comprised of a hydraulic pump immersed in and with an inlet to receive the supplement surface waters and a jet supplied with said supplement surface waters and carried by the lower end of the member with an outlet immersed in and disposed to discharge upwardly imparting vertical momentum to the underlying nutrient rich waters and thereby transferring the same into the overlying photic zone waters to enrich the latter with the former.

4,051,811

STARTING APPARATUS FOR RODEO EVENTS

Arthur C. Smith, Phoenix, Ariz.

Filed Sept. 2, 1976, Ser. No. 719,572
Int. Cl.[2] A01K *1/00*; A63K *3/02*
U.S. Cl. 119—15.5 A **7 Claims**

1. In a rodeo stall for detaining a contestant, which stall includes:

a first stationary support member,

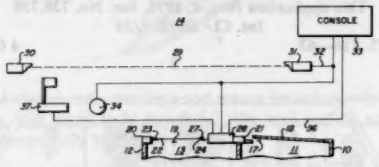
a second stationary support member spaced from said first support member and defining an exit opening therebetween for said contestant,

a flexible barrier secured at one end to said first support member and having a free end extending substantially to said second support member, and

biasing means normally urging said free end of said barrier from said second support member,

an improved latching device for use in combination therewith for detachably engaging the free end of said barrier and for releasing said barrier in response to a predetermined signal, said latching device comprising:

a. a frame for attachment to said second support member;



b. engagement means for detachably engaging the free end of said barrier and carried by said frame,

said means normally holding said barrier against the force of said biasing means and releasing said barrier in response to the application of additional force to said barrier; and

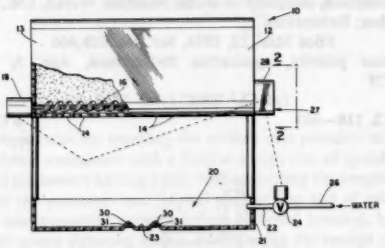
c. release means carried by said frame and cooperating with said biasing means for operatively disengaging said barrier from said engagement means.

4,051,812

AUTOMATIC ANIMAL FEEDING APPARATUS

Guessman L. DeLoach, and Phillip H. Foster, both of R.R. No. 3, Metter, Ga. 30439

Filed Aug. 23, 1976, Ser. No. 716,574
Int. Cl.[2] A01K *5/02*
U.S. Cl. 119—51.11 **11 Claims**



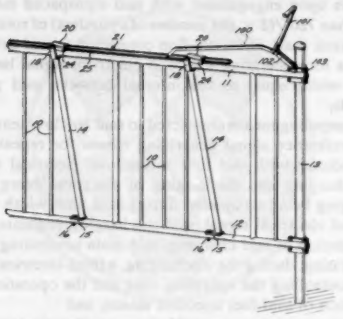
1. An animal feeding apparatus including a receptacle having a bottom, means for dispensing conductive animal food into the receptacle, a pair of conductive sensors mounted upon the bottom of the receptacle, means for controlling the dispensing means according to information received from the sensors, means for establishing a flow of electric current between the sensors when conductive food is positioned between the sensors, and means for operating the controlling means to cause the dispensing means to dispense additional food into the receptacle in response to the electric current flowing between the sensors falling below a predetermined level when the level of food within the receptacle is reduced, said predetermined current level being selected to require substantially all of the food within the receptacle to be removed before said predetermined current level is reached.

4,051,813

LOCKING STANCHION FOR CATTLE

Teunis Albers, 18007 Arline Ave., Artesia, Calif. 90701

Filed Sept. 15, 1975, Ser. No. 613,169
Int. Cl.[2] A01K *1/00*
U.S. Cl. 119—148 **3 Claims**



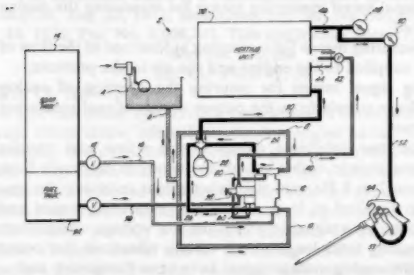
2. In a cattle locking stanchion of the type in which a plurality of substantially vertically extending release rails are pivotally mounted at their lower ends on a bottom rail, extend above a top rail, and are associated at their upper ends with a horizontally extending, reciprocally mounted master release rod located above said top rail and operative for simultaneous movement of all of said release rails between a vertical closed position and a slightly angular open position, the improvement comprising: a horizontally elongated release bracket for each of said release rails, each said release bracket having one end thereof pivotally connected to the upper end of one of said release rails for movement about a transverse pivot axis, the opposite and of said release bracket having a first portion removably received in an upwardly opening detent provided in said master release rod, the weight of said first portion urging said first portion downwardly into said detent whereby all of said release rails are movable between said open and closed positions upon reciprocation of said master release rod, each said release bracket being manually upwardly pivotable whereby the associated one of said release rails is pivotable independently of the others of said release rails, each said detent including opposite undercut extremities for receiving said first portion and preventing said first portion from moving upwardly whereby said first portion must be generally centrally located in said detent for upward movement.

4,051,814

HIGH PRESSURE WASHER

William S. Jennings, West Covina, Calif., assignor to Clayton Manufacturing Company, El Monte, Calif.

Filed Apr. 27, 1976, Ser. No. 680,966
Int. Cl.[2] F22D *5/00*; F23N *1/08*
U.S. Cl. 122—448 R **10 Claims**



1. A combination liquid and fuel pumping apparatus for use in a pressurized hot fluid washer having an output conduit for applying the hot fluid, an operator controlled delivery valve, and heat exchanger means for heating the fluid including a fuel burner, comprising:

a liquid pump member adapted to being connected to the heat exchanger;

a fuel pump member adapted to being connected to the fuel burner;

a closed hydraulic prime mover means for applying a driving impulse force to both the liquid pump member and the fuel pump member including a by-pass conduit;

means for reducing the force of the driving impulse force before applying the force to the fuel pump member;

means for hydraulically sensing the liquid pressure downstream of the liquid pump member; and

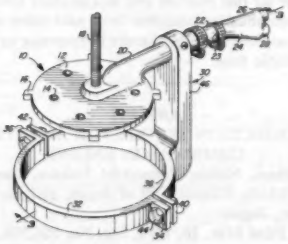
hydraulic means for opening the by-pass conduit to automatically stop the fuel pump member and the liquid pump member in response to a sensed predetermined liquid pressure.

4,051,815

FLUID INJECTION APPARATUS FOR INTERNAL COMBUSTION ENGINE

Lavan E. Coberley, 2223 W. Colter, Phoenix, Ariz. 85015

Filed Sept. 15, 1975, Ser. No. 613,170
Int. Cl.[2] F02D *19/00*
U.S. Cl. 123—25 A **10 Claims**



1. In combination with an internal combustion engine having a carburetor, an apparatus for injecting fluid into said carburetor, said apparatus comprising:

plate means connected to the carburetor of an internal combustion engine;

a pump for providing a flow of pressurized air;

conduit means secured to the plate means for providing a flow of fluid and pressurized air to the plate means;

a first intake line secured to the conduit means and to the pump for providing a flow of pressurized air to the conduit means;

a second intake line secured to the conduit means and disposed directly above the first intake line for providing a flow of fluid to the conduit means;

a mixer chamber in the conduit means at the juncture of the first and second intake lines and spaced apart from the plate means for mixing the flow of pressurized air and the flow of fluid together; and

an opening at the juncture of the conduit means and the plate means through which the flow of fluid and air flows into the carburetor.

4,051,816

METHOD OF AND APPARATUS FOR CONTROLLING AIR-FUEL MIXTURES INTO A MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

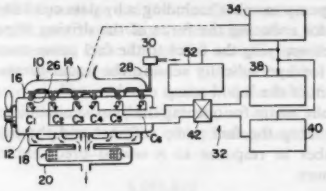
Kenji Masaki, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed June 5, 1975, Ser. No. 584,133

Claims priority, application Japan, June 13, 1974, 49-67463

Int. Cl.[2] F02M *51/00*; F02B *75/10*

U.S. Cl. 123—32 EA **9 Claims**



1. A method of controlling an air-fuel mixture for an internal combustion engine, comprising the steps of

alternatively forming a relatively rich air-fuel mixture having an air-fuel ratio lower than a predetermined air-fuel ratio and a relatively lean air-fuel mixture having an air-fuel ratio higher than said predetermined air-fuel ratio for a first combustion chamber of said engine,

alternatively forming said rich and lean air-fuel mixtures for a second combustion chamber of said engine so that, when one of said rich and lean air-fuel mixtures is formed for said first combustion chamber, the other air-fuel mixture is formed for said second combustion chamber,

sensing the lapse of a suitable time, and

switching over said mixture formed for said first combustion chamber from one of said rich and lean air-fuel mixtures to the other air-fuel mixture and said mixture formed for said second combustion chamber from said other air-fuel mixture to said one air-fuel mixture in response to the lapse of said suitable time.

4,051,817

FUEL INJECTION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

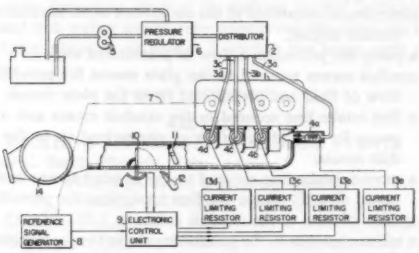
Tadashi Hattori, Nishio; Takamichi Nakase, Gamagori, and Minoru Nishida, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Japan

Filed Mar. 10, 1975, Ser. No. 556,953

Claims priority, application Japan, Apr. 18, 1974, 49-43566

Int. Cl.[2] F02B *3/00*

U.S. Cl. 123—32 EA **4 Claims**



1. A fuel injection system for an internal combustion multi-cylinder engine comprising:

fuel injection means for injecting fuel under a predetermined pressure into each of a plurality of cylinders in said engine;

an air-flow sensor arranged in the suction duct of said engine for generating a first electrical signal corresponding to the quantity of air drawn into said engine;

a reference signal generating means adapted to be connected to the crankshaft of said engine and having a rotor associated with said crankshaft and provided with as many equispaced means thereon as the number of said cylinders, a pair of detecting means arranged to generate a pair of signals upon engagement with said equispaced means in less than $720°/(2 \times$ the number of cylinders) of rotation of the crank shaft, and a flip-flop connected to said detecting means for generating a second electrical signal having a time width equal to the internal between said pair of signals;

main computing means connected to said air-flow sensor and said reference signal generating means for repeating, in accordance with said first and second electrical signals, the charging and discharging of electrical energy, said charging being completed during said time width of said second electrical signal, said discharging beginning after completion of said charging, said main computing means generating, during the discharging, a third electrical signal for controlling the operating time and the operating time duration of said fuel injection means; and

distributing means connected between said main computing means and said fuel injection means for separately distributing said third electrical signal to said fuel injection means in accordance with the firing order of said engine.

4,051,818

DEVICE FOR OBTAINING SIGNALS FOR THE CONTROL UNIT OF AN ELECTRONIC FUEL INJECTION SYSTEM

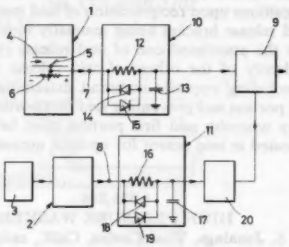
Jürgen Völckers, Grussendorf, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Oct. 30, 1975, Ser. No. 627,290

Claims priority, application Germany, Nov. 23, 1974, 2455482; Feb. 13, 1975, 2506078

Int. Cl.[2] F02D *5/00*

U.S. Cl. 123—32 EA **10 Claims**



1. An electronic fuel injection system of an internal combustion engine comprising:

rotational speed measuring means for measuring the engine speed;

air measuring means for measuring at least one of the flow of air supplied to the engine and the air intake pressure;

analog signal means for assuring the creation of analog voltage signals from the output signals of said measuring means;

at least one stabilizing means having a low pass transfer characteristic with a cut-off frequency in the range from about 2 to 8 Hz, said stabilizing means receiving the analog signal of at least one of said measuring means and producing a signal in which the a.c. voltage components resulting from longitudinal vehicle vibrations that occur in the analog voltage signal have been dampened; and

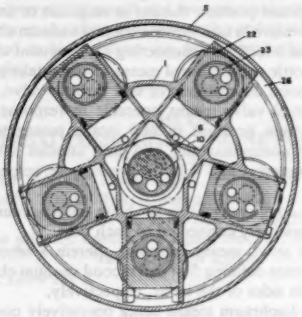
a control unit for controlling the injection of fuel in response to at least the dampened signal from said stabilizing means.

4,051,819

ROTARY BLOCK ENGINE

Sten Henstrom, Mesangatan 2, 234 00 Lomma, Sweden

Filed Mar. 24, 1976, Ser. No. 669,750
Int. Cl.[2] F02B *57/10*
U.S. Cl. 123—44 B **7 Claims**



1. In a rotary-block engine comprising a rotatable cylinder block having a plurality of radially mounted cylinders therein, a main shaft supporting said cylinder block and rotatable with said cylinder block, each of said plurality of cylinders having a reciprocating piston mounted therein which is moved in response to the explosion of a combustion gas in the combustion chamber of the cylinder, a plurality of secondary shafts, one for each of said plurality of cylinders, for rotatably mounting thereon the plurality of reciprocating pistons, and a stationary housing rotatably mounting therein said main shaft and said cylinder block, wherein the improvement comprises: said main shaft being an eccentric shaft and mounting said cylinder block on the eccentric thereof so that a point on said cylinder block traces a path in the form of an epitrochoid, each of said plurality of secondary shafts also being an eccentric shaft, each of said pistons being mounted on the eccentric of its respective secondary shaft so that a point on the piston will trace a path in the form of a hypotrochoid, means for fixing the spacing between said main shaft and said cylinder block and radially fixing the plurality of secondary shafts with respect to said main shaft, each of said secondary shafts rotating at a speed less than the speed of said main shaft and each of said pistons having a speed about said main shaft that is also less than the speed of said main shaft, and means for controlling the movement of said pistons so that they move in said hypotrochoid manner.

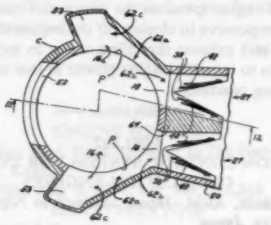
4,051,820

ENGINE VALVING AND PORTING

Eyvind Boyesen, Huntington Valley, Pa., assignor to Performance Industries, Inc., Huntington Valley, Pa.

Continuation-in-part of Ser. No. 375,065, June 29, 1973, Pat. No. 3,905,340, which is a continuation-in-part of Ser. No. 282,734, Aug. 22, 1972, abandoned, and Ser. No. 361,407, May 18, 1973, Pat. No. 3,905,341. This application June 11, 1975, Ser. No. 586,138
Int. Cl.[2] F02B *33/04*
U.S. Cl. 123—73 A **6 Claims**

1. A fuel intake system for a variable speed two-cycle crankcase compression internal combustion engine having a piston working in a cylinder with transfer porting extended between the compression and the intake sides of the piston and with an intake port adapted to communicate with the cylinder at the intake side of the piston when the piston is positioned to block the transfer porting, a fuel intake chamber for receiving fuel from a supply source and for delivering the fuel to the intake port, a ported valve seat presented downstream of the fuel flow through the intake chamber, a primary reed valve covering said seat and the valve port therein, said primary reed being supported throughout substantially its entire periphery by said seat and being sufficiently flexible to open the port under the influence of decrease in pressure in the intake chamber incident to high speed engine operation but being sufficiently rigid to remain closed under the influence of decrease in pressure in the intake chamber incident to low speed engine operation, said



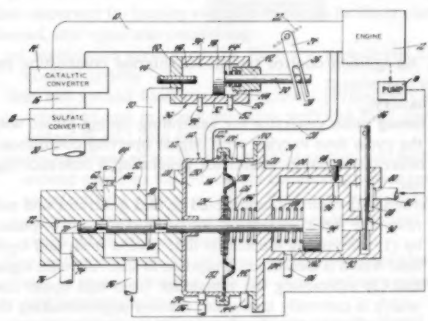
primary reed having a secondary valve port therethrough of smaller size than the port through the valve seat, and a secondary reed valve covering the secondary port and being sufficiently flexible to open the secondary port under the influence of decrease in pressure in the intake chamber incident to engine operation either at said high speed or at said low speed.

4,051,821

EXHAUST BACK PRESSURE CONTROL

Charles A. Amann, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 30, 1976, Ser. No. 718,812
Int. Cl.[2] F02D *31/00*; F01N *7/00*
U.S. Cl. 123—97 B **3 Claims**



1. In a motor vehicle having a fuel burning engine with an exhaust system, including components having variable flow resistance, an exhaust pressure control to automatically maintain a scheduled back pressure on the engine over a normal operating speed and load range despite changes in the flow resistance of the other exhaust components, comprising: a pivotal throttling valve located downstream from the engine and upstream from the variable resistance exhaust components; positioning means connected to said throttling valve for pivotal control of said throttling valve between open and a more closed operative position; an exhaust back pressure sensor including enclosure means with a flexible diaphragm responsive to the exhaust system pressure upstream from said throttling valve to produce a force on said diaphragm in one direction; an engine driven fluid pump for pressurizing fluid corresponding to operation of the engine; a controller assembly including a housing defining an interior space with an inlet thereto fluidly connected to said engine-driven pump for receiving pressurized fluid therefrom; said controller housing enclosing a piston member movable in response to fluid pressure within said interior space to produce a force on the piston

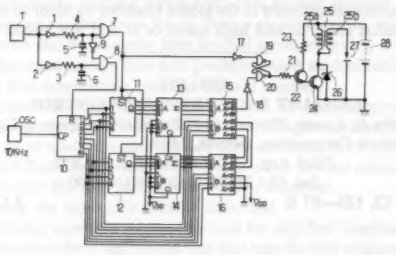
member in a direction opposite to said one direction of said diaphragm force; a fluid valve means including a reciprocal valving member connected to said diaphragm and said piston member for regulating the transmission of fluid pressure from said engine-driven pump to said positioning means, thereby transmitting pressurized fluid to said throttling valve positioning means corresponding to the effects of exhaust system back pressure and engine speed on the sensor and controller assembly; means responsive to closing off the engine throttle control for causing said exhaust throttling valve to move to a more open position to increase engine power at low speed and light load operating conditions.

4,051,822

IGNITION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Hiroshi Yoshida, Aichi, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Mar. 23, 1976, Ser. No. 669,475
Claims priority, application Japan, Mar. 31, 1975, 50-39483
Int. Cl.[2] F02P 5/04
U.S. Cl. 123—117 D **4 Claims**



1. An ignition control system for internal combustion engines comprising:

a battery;

a timing pulse generator for generating timing pulses with the cycle time varying with engine operting conditions;

a reference signal generator for generating a reference signal;

a computation circuit, connected to said generator and said reference signal generator, for producing control pulses, by (1) subtracting a constant time period from said cycle time which is measured in response to said reference signal and (2) subtracting the remainder from said cycle time which is currently measured, thereby approximating the width of said control pulses to said constant time period,

an ignition coil, connected to said battery and said computation circuit, for providing ignition energy in response to said control pulses from said computation circuit; and

at least one spark plug, coupled to said ignition coil, for providing ignition sparks.

4,051,823

INTERNAL COMBUSTION ENGINE

Minoru Mogi, Tokyo, and Shoichi Matsumoto, Mitaka, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1975, Ser. No. 639,160
Claims priority, application Japan, Dec. 24, 1974, 49-1202[U]
Int. Cl.[2] F02P 5/04
U.S. Cl. 123—117 A **2 Claims**

1. In an internal combustion engine, having

a fuel mixture intake passageway,

a throttle valve rotatably mounted across said passageway and movable from a closed engine idling position to a widely opened position, and defining an atmospheric side on one side thereof, and a vacuum side on an opposite side thereof,

a throttle valve control means including therein a first diaphragm means defining a throttle control vacuum chamber on one side of the latter,

said first diaphragm means being operatively connected to said throttle valve for rotating said throttle valve to a slightly opened position thereof in response to an intake vacuum pressure in said throttle control vacuum chamber,

a first conduit selectively connecting said vacuum chamber of said throttle valve control means to said intake passageway at a point downstream of said throttle valve,

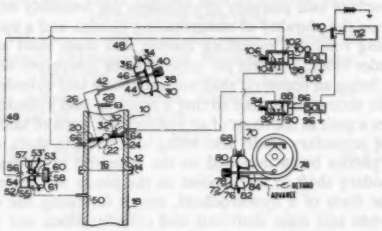
vacuum control valve means operable in response to the intake vacuum pressure in said intake passageway for selectively communicating said first conduit with said intake passageway and with the atmosphere, respectively, and

a distributor comprising a breaker plate and a vacuum servo means operatively connected to each other,

said vacuum servo means including therein a second diaphragm means defining first and second vacuum chambers on opposite sides of the latter, respectively,

said second diaphragm means being operatively connected to said braker plate for biasing said braker plate toward a spark timing advance position in response to vacuum pressure in said first vacuum chamber and for biasing said braker plate toward a spark timing retarded position in response to vacuum pressure in said second vacuum chamber, respectively,

the improvement comprising:



a first solenoid valve means and a second solenoid valve means for being actuated in dependency on engine speed, respectively,

a second conduit connecting said first vacuum chamber of said vacuum servo means to said first solenoid valve means,

a third conduit connecting said first solenoid valve means to said intake passageway at a position adjacent said throttle valve such that said third conduit communicates with the atmosphere side of said throttle valve when the throttle valve is closed in idle position and communicates with said intake passageway at the vacuum side of said throttle valve when the throttle valve is slightly opened, respectively,

said first solenoid valve means communicating said first vacuum chamber in said vacuum servo means with atmosphere when engine speed is lower than a predetermined reference engine speed, and for communicating said first vacuum chamber with said intake passageway via said third conduit when the engine speed is higher than the predetermined speed, respectively,

a fourth conduit connecting said second vacuum chamber of said vacuum servo means to said second solenoid valve means,

a fifth conduit connecting said second solenoid valve means to said intake passageway at another position adjacent said throttle valve such that said fifth conduit communicates with the vacuum side of said throttle valve when the throttle valve is closed in idle position and communicates

with the atmospheric side of said throttle valve when the throttle valve is slightly opened, respectively, and

a sixth conduit connecting said second solenoid valve means to said first conduit,

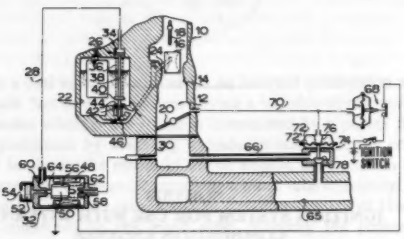
said second solenoid valve means communicating said second vacuum chamber in said vacuum servo means with said fifth conduit when the engine speed is lower than the predetermined speed, and for communicating said second vacuum chamber with said sixth conduit when the engine speed is higher than the predetermined speed, respectively.

4,051,824

INTERNAL COMBUSTION ENGINE FOR MOTOR VEHICLES

Katsuhiko Sugiura, Tama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1975, Ser. No. 634,787
Claims priority, application Japan, Nov. 30, 1974, 49-138762
Int. Cl.² F02N *25/06*
U.S. Cl. 123—119 A **6 Claims**



1. An internal combustion engine, comprising,

an induction passage,

a venturi formed in said induction passage,

a throttle valve rotatably disposed in said induction passage for controlling the quantity of air-fuel mixture flow therethrough,

a fuel reservoir,

means for supplying fuel to said induction passage in accordance with the quantity of air flow through said induction passage,

means for supplying additional fuel to said induction passage,

said means for supplying additional fuel comprising an additional fuel valve means for controlling the additional fuel and a vacuum means for operating said additional fuel valve means,

an exhaust passage communicating with said induction passage,

passage means for recirculating a part of exhaust gases from said exhaust passage into said induction passage at the downstream of said throttle valve,

a first valve means for controlling recirculation of exhaust gases through said recirculating passage means,

a vacuum conduit communicating said first valve means with an atmospheric side of said throttle valve in said induction passage,

said first valve means including a servo means operatively connected to said induction passage at a location positioned on the atmospheric side of and adjacent to said throttle valve when said throttle valve is closed in idle position through said vacuum conduit, a spring normally biasing said first valve means for blocking flow of exhaust gases through said recirculating passage means, said first valve means for being acted on by vacuum in said induction passage against said spring to permit the flow of exhaust gases through said recirculating passage means,

a first conduit for operatively connecting said vacuum means with said induction passage downstream of said throttle valve,

means for controlling the vacuum applied to said vacuum means through said first conduit,

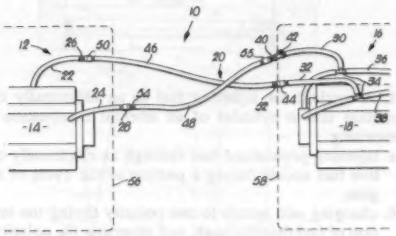
said means for controlling the vacuum including a solenoid valve means adapted for actuation simultaneously with actuation of said first valve means for controlling the vacuum applied to said vacuum means for the supply of the additional fuel.

4,051,825

ENGINE HEATER

Hayden O. Elder, Troy, Kans., assignor to The Hay-Mar Corporation, Troy, Kans.

Filed Aug. 6, 1976, Ser. No. 712,244
Int. Cl.² F02N *17/02*
U.S. Cl. 123—142.5 R **4 Claims**



1. In combination with a cold, fluid-cooled automotive engine, apparatus for heating said cold engine to facilitate starting thereof, said apparatus comprising:

an automotive service engine having a pressurized fluid-cooling system;

first and second fluid conduit segments permanently connected to and in communication with the fluid cooling system of said cold engine;

coupling means adjacent the outermost ends of said first and second segments for detachably connecting said segments to selectively present a closed fluid loop with said cold engine system, and alternately open-ended conduit segments when said coupling means are detached;

first and second conduit sections permanently connected to and in communication with the fluid cooling system of said service engine;

coupling structures adjacent the outermost ends of said first and second sections for detachably connecting said sections to selectively present a closed fluid loop with said service engine system, and alternately open-ended conduit sections when said coupling structures are detached;

a pair of fluid-transfer conduits of length to span the distance between said conduit segments and sections; and

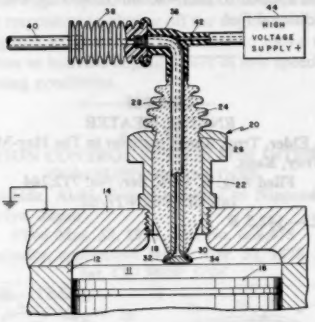
attachment means adjacent the opposed ends of said transfer conduits for detachably connecting one of the transfer conduits between the coupling means of one of said segments and the coupling structure of one of said sections, and for detachably connecting the other of said transfer conduits between the remaining segment coupling means and section coupling structure, when said segments and sections are detached, in order to define a closed fluid loop with the cooling systems of said cold and service engines, whereby, upon running of said service engine with the cooling fluid therein in a heated condition, such heated fluid is circulated throughout the last-mentioned closed fluid loop for heating said cold engine and for facilitating starting thereof.

4,051,826

MEANS AND METHOD OF INJECTING CHARGED FUEL INTO INTERNAL COMBUSTION ENGINES

Clyde N. Richards, 4887 Mission Blvd., San Diego, Calif. 92109

Filed July 10, 1975, Ser. No. 594,748
Int. Cl.[2] F02D 23/00
U.S. Cl. 123—143 B 4 Claims



1. A method for injecting fuel in an electrically charged condition into a cylinder of an internal combustion engine comprising:

a. injecting pressurized fuel through an electrically conductive fuel nozzle during a portion of the cycle of said engine;

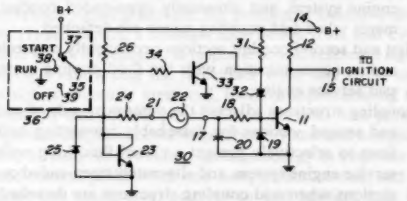
b. charging said nozzle to one polarity during the introduction of fuel therethrough, and reversing the polarity of the charge on said nozzle substantially at the termination of the fuel injection phase.

4,051,827

SELECTIVE THRESHOLD IGNITION CIRCUIT

Zbynek Antonin Capurka, Glen Ellyn, and Ronald William Rumple, Schaumburg, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 12, 1976, Ser. No. 648,556
Int. Cl.[2] F02P 1/00
U.S. Cl. 123—148 E 16 Claims



1. A selective threshold ignition circuit adaptable for use in an electronic ignition system of an engine, said circuit comprising:

sensor means for producing an AC electrical signal about a predetermined DC electrical reference level, said AC signal being created in response to and having a frequency related to the rotational movement produced by an engine;

switching circuit means, having a predetermined DC threshold level, coupled to said sensor means for receiving said AC signal varying about said DC reference level and producing a corresponding spark timing signal by effectively comparing said received AC signal varying about said DC reference level with said DC threshold level and switching when said received AC signal varying about said DC reference level varies, with respect to said threshold level, from above to below said threshold level and from below to above said threshold level;

selection means coupled to at least one of said sensor means and said circuit means for selecting at least first and second modes of operation for the combination of said sensor means and said switching circuit means in response to corresponding first and second control signals being received by said selection means, in said first mode of operation said DC reference level being substantially equal to said DC threshold value, in said second mode of operation said DC reference level being effectively different from said DC threshold level; and

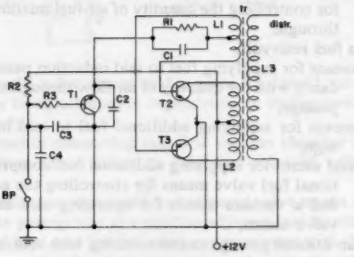
means coupled to said selection means for producing said first and second control signals and supplying them to said selection means; whereby said spark timing signal is adaptable for use in developing ignition pulses for the engine and the noise immunity of said ignition circuit is increased for one of said first and second control signals without substantially affecting the accuracy of the spark timing signal while a more accurate spark timing signal is obtained for the other one of said first and second control signals.

4,051,828

IGNITION SYSTEM FOR USE WITH INTERNAL COMBUSTION ENGINES

Eugene Frank Topic, Drugs. St., Glamorgan Shop. Center, Calgary, Alberta, Canada (T3E 3K1)

Filed Dec. 29, 1975, Ser. No. 635,571
Int. Cl.[2] F02P 1/00
U.S. Cl. 123—148 E 1 Claim



1. An ignition system for an internal combustion engine for improving the efficiency and reducing noxious emissions thereof by causing turbulent combustion by means of an electrical ignition impulse across a spark gap, said electrical ignition impulse having a sinusoidal waveform and a frequency of about 10,000 to 15,000 Hertz, said ignition system comprising:

a. a transformer having a power secondary coil connected to said spark gap, a power primary coil, and a feedback primary coil, said primary coils each having center taps,

b. a transistor power amplifier connecting said power primary coil and said feedback coil,

c. a switching transistor connected to said center tap of said feedback primary coil,

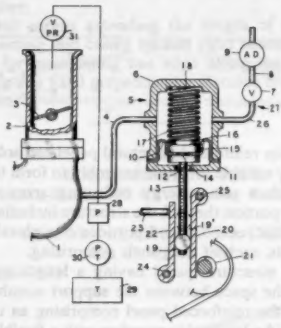
d. a DC bias voltage connected to said center of said power primary coil, and

e. breaker points connecting said switching transistor to ground.

4,051,829
AUDIBLE ENRICHMENT BLEED WARNING DEVICE FOR FUEL-INJECTED ENGINES

Roger Owen Durham, 3944 Marathon St., Los Angeles, Calif. 90029

Filed Nov. 5, 1975, Ser. No. 629,140
Int. Cl.² F02B *77/00*
U.S. Cl. 123—198 D **6 Claims**

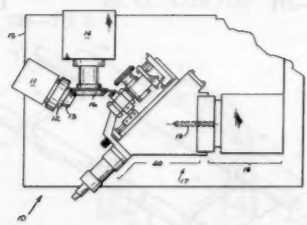


1. In a fuel injection system for an internal combustion engine, said fuel injection system having a variable-stroke pump mechanism wherein the stroke is determined by a power fulcrum positioned by a sensing cylinder means which is connected to the intake manifold of the engine, and wherein an enrichment bleed means, comprising a bleed tube connected to said sensing cylinder means and an operator-controlled bleed valve connected to the bleed tube, whereby the pressure within the sensing cylinder means can be abnormally raised by opening the bleed valve, thus increasing the "stroke of the variable pump mechanism; on" an audible enrichment bleed warning device connected to said enrichment bleed means, and operated by air passing through said bleed valve when it is open, said audible enrichment bleed warning device capable of omitting sounds audible to the operator and reminding him of the open enrichment bleed valve and rich running condition of the engine.

4,051,830
WHEEL DRESSING APPARATUS AND METHOD

Paul Gruber, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed May 11, 1976, Ser. No. 685,286
Int. Cl.² B24B *53/00*
U.S. Cl. 125—11 R **10 Claims**



1. In a grinding machine, having a rotatable grinding wheel with a nib-dressed main face and a wheel-dressed second face intersecting the main face, an improved wheel dressing apparatus for conditioning both the main and second faces in a one-direction stroke, comprising in combination:

a. a housing, fixed with respect to said wheel when dressing;

b. a carrier bracket, movable on said housing with respect to said grinding wheel;

c. a way system upon said housing to provide carrier bracket movement generally parallel to the nib-dressed main face;

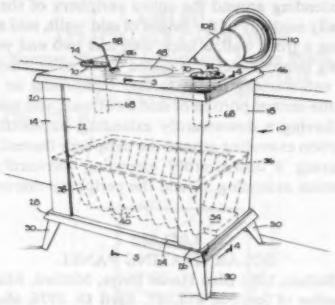
d. a dressing nib carried by said carrier bracket so as to dress said main face as said bracket is moved parallel to said main face; and

e. a dressing wheel, rotatable on an axis transverse to said main face, and carried in tandem with said nib on said bracket so as to dress the second face through continued parallel movement of said bracket.

4,051,831
HEATING STOVE

Eugene Peter Schellens, Essex, Conn., assignor to South Cove Corporation, Inc., Essex, Conn.

Filed Sept. 2, 1975, Ser. No. 609,712
Int. Cl.² F24B *5/04*
U.S. Cl. 126—76 **8 Claims**



1. A heating stove for wood-like organic material comprising, in combination, a fire box for receiving material to be burned substantially centrally therein, said fire box including sidewalls, bottom means connected towards the bottom of the sidewalls, and a cover mounted towards the upper ends of the sidewalls, and means for sealing the fire box so as to render it substantially air-tight, means for providing access to the interior of said fire box, at least one substantially vertically aligned draft tube depending downwardly from said cover into the fire box for receiving combustion air at substantially atmospheric conditions from the upper end thereof and directing a flow to impinge upon the hearth adjacent the material to be burned from above and substantially in a vertical direction, flue means mounted on the fire box above the material to be burned and in spaced relationship with respect to the draft tube for removing the products of combustion and maintaining the fire box at a pressure below atmospheric pressure, regulator means for regulating the flow of combustion air in said draft tube, said regulator means for the draft tubes comprising a support disc having an aperture therein for receiving the open upper end of the draft tubes, said draft tubes being fixedly mounted on said supporting disc, said supporting disc being fixedly mounted on said cover, said cover having an opening, an outer draft control disc, said cover having an opening for receiving said outer draft control disc, an inner draft control disc fixedly connected to the outer draft control disc and having a greater outside diameter with respect to the outside diameter of said outer disc to thereby form a lip portion which engages the lower surface of the cover to retain said discs in position with respect to said cover, said outer disc having an opening and said inner disc having an opening which are in alignment with each other and are of a diameter substantially equal to the diameter of said draft tube, the center line of the draft tube being off-set with respect to the center line of the inner and outer discs so that when said discs are rotated they progressively cover the open-

ing in the top of the draft tube corresponding to the extent of rotation.

5. A heating stove for burning wood-like organic material comprising, in combination, a fire box for receiving material to be burned substantially centrally therein, said fire box including sidewalls, bottom means connected towards the bottom of the sidewalls, and a cover mounted towards the upper ends of the sidewalls, and means for sealing the fire box so as to render it substantially air-tight, means for providing access to the interior of said fire box, at least one substantially vertically aligned draft tube depending downwardly from said cover into the fire box for receiving combustion air at substantially atmospheric conditions from the upper end thereof and directing a flow to impinge upon the hearth adjacent the material to be burned from above and substantially in a vertical direction, flue means mounted on the fire box above the material to be burned and in spaced relationship with respect to the draft tube for removing the products of combustion and maintaining the fire box at a pressure below atmospheric pressure, anti-warping means for preventing warpage of the fire box during operation, said anti-warping means comprising an inwardly projecting rib extending around the entire periphery of the fire box substantially medially of the height of said walls, said side walls comprising a front wall, a back wall and two end walls, said walls being interconnected in sealed relationship respectively, and said anti-warping means further comprising an enlarged recess in the central portion of said front wall, and said bottom member having a downwardly extending outwardly angled apron portion extending around the periphery thereof, and said cover having a downwardly extending outwardly angled apron portion extending around the periphery thereof.

4,051,832

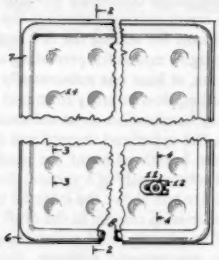
SOLAR HEATING PANEL

William Stelzer, 1354 Blue Heron Drive, Milford, Mich. 48042

Continuation of Ser. No. 678,167, April 19, 1976, abandoned. This application Jan. 21, 1977, Ser. No. 761,497

Int. Cl.² F24J 3/02

U.S. Cl. 126—270 **3 Claims**



1. A solar heating panel for converting the sun's rays into heat, comprising a single, flat pane of glass, a sheet metal panel behind said pane of glass in spaced relationship therewith to provide a space between said pane of glass and said metal panel, said sheet metal panel and said pane of glass having peripheral outer portions, a peripheral hermetical seal between said outer portion of said pane of glass and said outer portion of said sheet metal panel, a vacuum in said space, said sheet metal panel having a blackened surface facing said pane of glass, evenly spaced projections pushed out of the plane of said sheet metal panel having sharp points resting against said pane of glass to resist the atmospheric pressure acting on said pane of glass and said sheet metal panel, said blackened surface serving to convert solar rays into heat to heat up said sheet metal panel. A vacuum connection arranged to be in communication with said space containing said vacuum, and means to close off said vacuum connection.

4,051,833

REINFORCED STRUCTURAL PANEL WITH INTEGRAL SOLAR ENERGY COLLECTING ARRAY AND METHOD OF PRODUCING AND ASSEMBLING SAME

Daniel D. Vandament, 527 Fairview Ave., Mill Valley, Calif. 94941

Filed Nov. 19, 1975, Ser. No. 633,380

Int. Cl.² F24J 3/02

U.S. Cl. 126—270 **17 Claims**

1. A composite reinforced structural panel and solar energy collecting array suitable for rapid assembly to form the roof of a structure with a solar energy collecting array extending along a surface portion thereof, the structure including spaced-apart supports for receiving end portions of a plurality of the structural panels, each of the panels comprising,

a reinforced structural panel having a length suitable for spanning the space between the support members of the structure, the reinforced panel comprising an upper skin member and a lower skin member with a flexible member arranged in the form of an arch therebetween and secured at its ends to the lower skin member, adhesive insulating material intimately contacting both sides of the flexible arched member and completely filling the spaces between the flexible arched member and the upper and lower skin members,

wedge shaped members being arranged between the adjacent end portions of the flexible arched member and lower skin member while being securely connected thereto, end blocks also being secured to the ends of the lower skin member and overlapping the ends of the flexible arched member,

joint means for securing each of the panels to an adjacent panel,

a solar energy collecting array being mounted upon the upper skin of the reinforced structural panel, and

manifold means providing an interconnection for the solar energy collecting array.

4,051,834

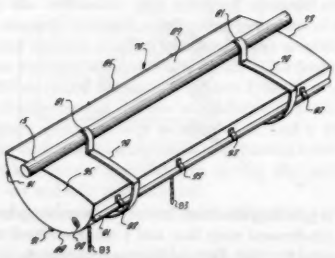
PORTABLE, LINEAR-FOCUSED SOLAR THERMAL ENERGY COLLECTING SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Charles G. Miller, Pasadena, and Jens G. Pohl, San Luis Obispo, both of Calif.

Filed Apr. 28, 1976, Ser. No. 680,939

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **12 Claims**



1. An inflatable linear solar thermal energy collector comprising:

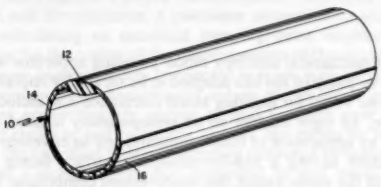
an extended casing of plastic material having both ends thereof sealed, a section of said casing being transparent;
a valve means attached to said casing for admitting a gas into said casing to inflate it;
a reflecting surface having a cylindrical surface of curvature contained within said casing;
rigid means attached to said casing for supporting said casing, when inflated, in a suspended manner, said rigid means being adapted to removably attach to a supporting member;
a conduit means extending the length of said casing for supporting said casing by said rigid means; and
means for maintaining one edge along the length of said casing at a fixed perpendicular distance from said conduit means.

4,051,835

SOLAR HEATING PIPE

George Hinson-Rider, 300 Circle Drive, Santa Fe, N. Mex. 87501

Filed Nov. 17, 1975, Ser. No. 632,510
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 4 Claims



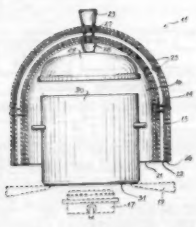
1. A solar heating pipe comprising,
a fluid conducting pipe,
at least one integral longitudinal portion of said pipe being transparent to solar heat rays,
said portion being parallel with the longitudinal axis of said pipe,
said portion comprising a cylindrical lens that focuses the solar heat rays to a focal axis within the volume of said pipe,
and the side of said pipe opposite said lens portion being coated with a light ray absorbent coating.

4,051,836

DOUBLE-WALLED COVER FOR COOKING FOOD

Carlos Lagunilla-Leca, Francisco del Paso y Troncoso No. 324B6, Unidad Kennedy, 9 Mexico City, Mexico

Continuation-in-part of Ser. No. 526,341, Nov. 22, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,208
Claims priority, application Mexico, Dec. 5, 1973, 147878
Int. Cl.[2] A21B *1/52*
U.S. Cl. 126—275 R 1 Claim



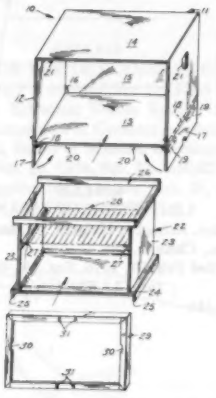
1. A cover having a double wall for cooking food which is placed over a burner comprising an outer wall in the shape of a bell, a manipulation knob located on said outer wall, an inner wall in the shape of a bell, a plurality of spacers located between said outer wall and said inner wall to secure said walls together in spaced relation, a first chamber for conserving the heat emanating from said burner defined by said inner wall which is open at its lower end only, and a second chamber substantially surrounding said first chamber defined by said inner and outer walls which is open at its lower end only to admit hot air thereinto, the first chamber being in direct communication with heat rising upwardly from said burner, and each of said walls of the cover including a metallic layer with a thermal insulating layer, each of the walls of the cover including three layers, the intermediate layer being thermally insulating and the two outer layers being metallic, and a kettle and a lid therefor, an adapter secured to the upper inside portion of said cover and the top of said lid to secure said lid to said cover, the lower edges of said cover being at the same level as the bottom of said kettle when resting upon a grate placed upon said burner which supports said cover and said kettle.

4,051,837

ATTACHABLE CAMP OVEN

Ambrose Norman, Box 67, Unalakleet, Alaska 99684

Filed June 18, 1976, Ser. No. 697,618
Int. Cl.[2] F24C *15/00*
U.S. Cl. 126—275 R 3 Claims



1. An attachable oven for a camp stove, comprising in combination, an outer casing of hollow configuration, said outer casing having hinged plate means secured thereto, for adaptation to a camp stove, an inner casing received within said outer casing having adjustable means for supporting a grill, a door frame secured to said inner casing with door means hingeably secured thereto, grooved support rail means removably received on edges of said hinged plate means, and lock means secured to said outer casing for retaining said hinged plates.

4,051,838

OVEN RACK

Cheryl Pinckney, 60 Magnolia Ave., Mount Vernon, N.Y. 10553

Filed Apr. 27, 1976, Ser. No. 680,855
Int. Cl.[2] F21C *15/16*
U.S. Cl. 126—340 2 Claims

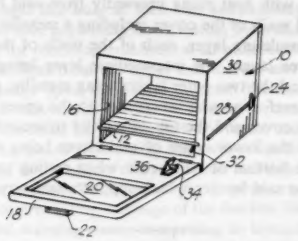
1. An oven comprising:
an oven chamber having a side wall,
at least one rack slidably mounted in said oven chamber,
an elongated slot in said side wall,
a handle connected said rack extending through said sidewall and slidable within said elongated slot to slide said rack into and out of said oven chamber,

a cover pivotally mounted on said oven adapted to close said oven chamber, and

cooperating means mounted on said rack and cover for pivoting said cover to open said oven chamber in response to said rack being slid out of said oven chamber,

said cooperating means including:

a downwardly extending push pin fixed to said rack, and



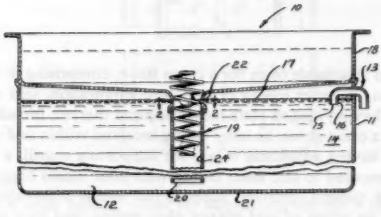
a bracket on said cover having a kick pin in abutment with said push pin when said rack is fully housed within said oven chamber and when said rack is at its furthermost extension out of said oven chamber in which position said kickpin serves as a stop restraining further movement of said rack.

4,051,839

LIME BREAKUP MEANS

Stanton H. Petry, Arlington Heights, Ill., assignor to Cory Food Services, Inc., Chicago, Ill.

Filed Feb. 27, 1976, Ser. No. 661,844
Int. Cl.² F24H *1/00*
U.S. Cl. 126—344 **8 Claims**



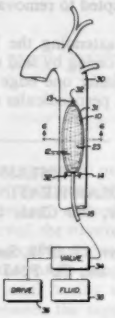
1. In a hot water heater having a heating tank, heating means for heating water in said tank, an outlet from the tank, and duct means defining an inlet flow passage extending downwardly into said tank for delivering water into a lower portion of said tank to be heated therein, improved means for preventing blockage of said flow passage by lime forming across the flow passage at the upper level of the water in the heating tank and flow passage as the result of heating thereof, said blockage prevening means comprising: a float having a horizontal cross section smaller than that of said flow passage; and cage means movably holding said float in said flow passage while permitting free flow of water downwardly therethrough, the float being vertically movably disposed at said upper water level in said flow passage.

4,051,840

DYNAMIC AORTIC PATCH

Adrian Kantrowitz, Pontiac, and Paul S. Freed, Oak Park, both of Mich., assignors to Sinai Hospital of Detroit, Detroit, Mich.

Filed Jan. 5, 1976, Ser. No. 645,735
Int. Cl.² A61M *1/03*; A61F *1/24*
U.S. Cl. 128—1 D **4 Claims**



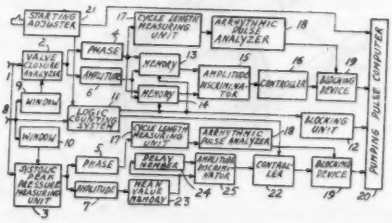
1. In a mechanical auxiliary blood pumping apparatus such as an aortic patch or the like adapted to be surgically implanted in an aortic vessel for assisting blood circulation and including a flexible, air tight bladder to be systematically inflated and deflated by application of fluidic pressure, and an envelope for said bladder having a non-thrombogenic surface facing the interior of the aortic vessel, the improvement comprising: said bladder and said envelope being distinct, separate, independent components of said apparatus, said envelope being adapted to be implanted and sutured into the aortic vessel in a tight, sealing relationship to the intima of the vessel to prevent leakage and loss of blood outwardly of the vessel, with said non-thrombogenic surface facing the interior of said aortic vessel, and said bladder being thereafter removably positioned within said envelope whereby said envelope is permanently implantable without damage to said bladder such as by puncturing during suturing and the like and whereby said bladder is insertable and removable without removal of said envelope and thus without extracorporeal bypass.

4,051,841

METHOD OF AND APPARATUS FOR AUTOMATICALLY CONTROLLING HEART-SYNCHRONIZED CIRCULATING PUMPS

Herwig Thoma, 40/3, Maroltingergasse, Vienna, Austria

Continuation-in-part of Ser. No. 435,387, Jan. 21, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 620,996
Claims priority, application Austria, Jan. 31, 1973, 851/73
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 R **14 Claims**



1. A method of controlling a heart pump for assisting the circulation of blood in an animal, comprising the steps of

a. coupling a heart sensor system to the body of the animal,
b. selecting by a pumping pulse computer a non-critical pumping pulse obtained by reference to the existing heart rate for starting circulation assistance,
c. analyzing the blood pressure beat for beat to obtain a calculated heart beat frequency,
d. continuously regulating the pump rate by reference to the calculated heart beat frequency thus obtained,
e. automatically interrupting the pumping action for one or more cycles, and effecting comparison measurements between characteristic values of blood pressure with and without pulsation by a time and pulse controlled timer during said interruption of the natural heartbeat with the heartbeat immediately preceding said interruption, and
f. stopping the pumping function of said mechanical heart-pump in the event that the calculated heartbeat frequency is not obtained.

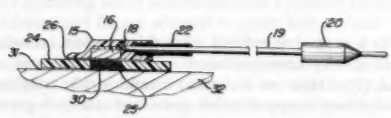
3. Apparatus for automatically controlling a heart synchronized circulating pump to control a patient's EKG and pressure parameters, said apparatus comprising, means coupling a heart sensor system to the body of a human patient whose heart is to be assisted by said pump and producing heart signals corresponding thereto, means for amplitude discriminating said heart signals, a period duration meter connected in series with said discriminator, a calculator connected to said meter for calculating an uncritical pumping pulse sequence, inlet means for the course of the blood pressure of the circulation, a pressure analyzer means connected in series with said inlet for determining the characteristic values of the blood pressure, means connecting the output of said analyzer over several heart cycles to said calculator, control line means for transferring the uncritical pumping impulses delivered by said calculator to a pump, a regulator connected to said pump, means connecting said calculator to said regulator for regulation of the operating cycles of said pump, a measuring cycle transmitter, circuit closer means for activating said measuring cycle transmitter, means connecting said amplitude discriminator with said measuring cycle transmitter, means connecting said measuring cycle transmitter both to said pump and said calculator, whereby for the control of the patient's EKG and pressure parameters a control system is provided and in that outlet lines both said regulator and said pump.

4,051,842

ELECTRODE AND INTERFACING PAD FOR ELECTRICAL PHYSIOLOGICAL SYSTEMS

Patrick Michael Hazel, and Roberta Evans Wells, both of Littleton, Colo., assignors to International Medical Corporation, Englewood, Colo.

Filed Sept. 15, 1975, Ser. No. 613,520
Int. Cl.[2] A61B 5/04
U.S. Cl. 128—2.06 E **11 Claims**



1. Apparatus for providing an electrical interconnection between a patient and electrical medical measurement equipment comprising:

an electrode assembly including a substantially flexible housing of electrically insulating material having a flat surface, an electrical conductor with a flat surface embedded and wholly contained within said housing with said flat surface thereof externally exposed from said housing so as to form a continuous coplanar flat surface with the flat surface of said flexible housing, and a conductive lead extending from said housing in electrical communication with said conductor, for completing an electrical circuit to the measurement equipment by extension from said housing through a surface other than said coplanar flat surface,

a detachable, disposable pad assembly including an annular body composed of a flexible, closed cell material having first and second parallel but oppositely disposed, substantially flat surfaces with a central bore extending therethrough, double adhesive surfaced disc means adhered to said first surface in surrounding relation to said bore and adhesively secured to said coplanar flat surface for releasably securing said pad assembly to said electrode assembly in proximity to said body with said flat conductor surface overlaying said bore, and an adhesive layer across substantially all of said second surface in surrounding relation to said bore adapted for retaining said pad assembly on the skin of the patient, and

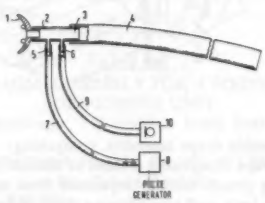
electrically conductive gelatinous means filling said bore for providing a relatively constant, low resistance electrical circuit between the skin of the patient in proximity to said bore and said electrical conductor surface, said gelatinous means being of a normal thickness greater than that of said pad assembly so as to be urged through an opening in said disc means into firm engagement with the exposed portion of said conductor on the flat surface of said housing when said pad assembly is applied to the skin of the patient thereby establishing an electrical interface between the patient and the medical measurement equipment while permitting both effective cleaning of said electrode assembly and disposal of said pad assembly and said gelatinous means thereafter.

4,051,843

APPARATUS FOR THE DETERMINATION OF THE RESPIRATORY PASSAGEWAY RESISTANCE

Manfred Franetzki, Erlangen; Volker Korn, Nuremberg, and Karl Prestele, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 20, 1976, Ser. No. 660,031
Claims priority, application Germany, Feb. 26, 1975, 2508319
Int. Cl.[2] A61B 5/08
U.S. Cl. 128—2.08 **10 Claims**



1. In an apparatus for the quantitative determination of the respiratory passageway resistance including a breathing tube, a flow resistance cooperating with the tube so as to be in the path of the breath flow, pulse generator means for subjecting the breath flow within the tube with higher-frequencied flow pulsations and pressure measuring means for measuring the pressure in said breathing tube, the improvement comprising:

a. said flow resistance being an elongate tube of predetermined length and internal diameter, which represents the approximately purely inductive part of a definite complex flow resistance with a known value (Re^{in});
b. said elongate tube being connected with an open end of the breathing tube;
c. said pulse generator means being an alternating-flow pressure pump connected with the breathing tube;
d. said pressure measuring means being set for the frequency of said alternating-flow pressure pump;
e. and measuring means for indicating the respiratory passageway resistance as a function of said known pulsation flow (I), said known flow resistance (R) and the measured pressure fluctuations (P).

4,051,844
TELESCOPING NEUROSURGICAL SCALP RETRACTOR

Robert D. Chiulli, Somerville, Mass., assignor to Medico Developments, Inc., Boxford, Mass.

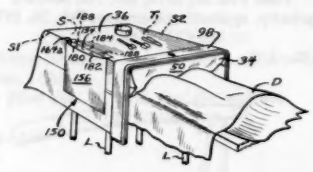
Filed May 7, 1976, Ser. No. 684,295
Int. Cl.[2] A61B 17/02
U.S. Cl. 128—20 2 Claims

1. A neurosurgical scalp retractor comprising an elongated frame, a first connector means at one end of said frame, said first connector means having a sharp point for penetrating said scalp, a rigid extensible member comprising a rod slidably disposed in said frame, releasable lock means for fixing said extensible member in a selected position to selectively determine the extent of said retractor, said lock means comprising leaf spring means attached to said frame and adapted to releasably exert a force upon said extensible member to prevent movement of said extensible member relative to said frame, and second connector means disposed at a free end of said extensible member.

4,051,845
DRAPE ASSEMBLY WITH POUCH AND METHOD

Robert F. Collins, Barrington, Ill., assignor to The Kendall Company, Boston, Mass.

Continuation-in-part of Ser. No. 664,136, March 5, 1976. This application May 5, 1976, Ser. No. 683,568
Int. Cl.[2] A61B 19/06
U.S. Cl. 128—132 D 16 Claims



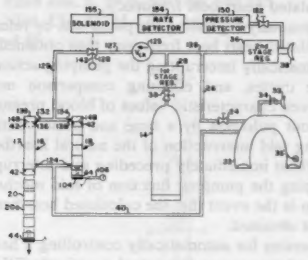
1. A disposable drape assembly, comprising:
a sterile drape comprising a sheet of flexible material; and
a retaining pouch initially separated from said drape and having a back wall comprising a sheet of flexible material, a front wall comprising a sheet of flexible material, with said sheets defining a pocket and an opening for placement of articles in the pouch, and means for attaching the pouch to the drape at a selected location after placement of the drape with the back wall facing the drape.

4,051,846
LIFE SUPPORT SYSTEM FOR DIVERS

Clifton M. McClure, III, 7228 Governors Drive, Huntsville, Ala. 35805

Filed Feb. 2, 1976, Ser. No. 654,469
Int. Cl.[2] A62B 7/02
U.S. Cl. 128—142 R 7 Claims

1. Diving apparatus comprising:
a source of gas pressure;
a cylinder having an intermediate region between its ends for slidably holding weight means for effecting negative buoyancy comprising at least one weight member;
a piston normally positioned in one end of said cylinder;
a cap normally positioned in the opposite end of said cylinder and including releasing means responsive to a selected force applied by said piston through said weights for releasing said cap from the end of said cylinder; and
normally closed valve means connecting said source of gas pressure and said one end of said cylinder;

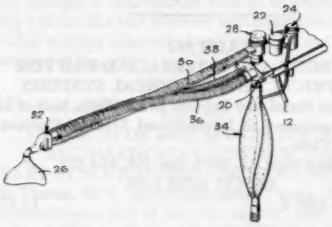


whereby upon the operation of said valve means, pressure is applied to said one end of said cylinder, forcing said piston and weight member in said cylinder toward said opposite end of said cylinder and applying a pressure on said releasing means, whereby said cap and weight are ejected from said cylinder.

4,051,847
ANESTHESIA REBREATHING APPARATUS

Melvyn Lane Henkin, 19640 Greenbriar Drive, Tarzana, Calif. 91356

Division of Ser. No. 448,816, March 7, 1974, Pat. No. 3,938,551, which is a division of Ser. No. 218,337, Jan. 17, 1972, Pat. No. 3,814,091. This application Oct. 24, 1975, Ser. No. 622,382
Int. Cl.[2] A61M 16/00
U.S. Cl. 128—145.6 2 Claims



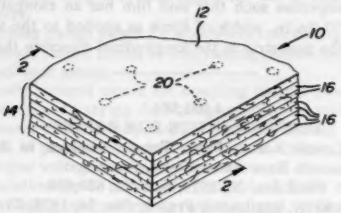
1. In a general anesthesia rebreathing system including (1) patient airway communication means, (2) fresh gas supply means, (3) at least one elongated breathing tube coupling said patient airway communication means and said fresh gas supply means, and (4) overflow valve means coupled to said breathing tube for venting excess gas therefrom at a normally encountered predetermined pressure, the improvement comprising:
overpressure relief means including first and second valve surfaces for permitting gas flow therepast in response to a positive pressure differential thereacross greater than said predetermined pressure at which said overflow valve means vents excess gas from said breathing tube;
means exposing said first valve surface to the pressure within said patient airway communication means and said second valve surface to ambient pressure; and
means responsive to gas flow past said overpressure relief means for producing an audible alarm.

4,051,848

SYNTHETIC SKIN WOUND DRESSING

Norman S. Levine, 237 Arlingham Road, Flourtown, Pa. 19031

Filed Mar. 1, 1976, Ser. No. 662,748
Int. Cl.² A61L 15/00
U.S. Cl. 128—156 12 Claims



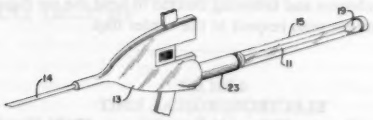
1. A unitary wound dressing comprising an inner component for application to tissue denuded of skin, and an outer component bonded to and substantially coextensive with said inner component, said inner component being made of at least two substantially coextensive layers of knitted fabric each bonded to the other at closely spaced points which will allow said inner component to readily stretch in two dimensions, said inner component having a thickness and thread spacing suitable for uniform invasion by cellular elements from said denuded tissue, said outer component comprising a stretchable membrane which is permeable to gases, but impermeable to microorganisms.

4,051,849

CATHETER FEEDING SYSTEM

Mark P. Poncy, and Richard P. Poncy, both of 3660 E. Indus. Way, Riviera Beach, Fla. 33404

Filed Apr. 6, 1976, Ser. No. 674,162
Int. Cl.² A61M 5/00
U.S. Cl. 128—214.4 11 Claims



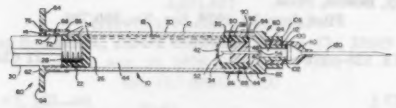
1. In a catheter placement and feeding system having a catheter fixture including a needle and a catheter having the front end thereof in said fixture and having the trailing end thereof extending out of said fixture from a catheter entrance in said fixture, said fixture adapted to guide said catheter along said needle when said catheter is fed forward into said catheter entrance, the improvement comprising: a tube for protecting the sterility of said catheter attached to said fixture at said catheter entrance surrounding the trailing portion of said catheter extending out of said catheter entrance, said tube having a flexible, resilient, cylindrical portion and a pleated portion, adapted to collapse axially, adjacent to said cylindrical portion and located between said cylindrical portion and said fixture, said cylindrical portion immediately adjacent to said pleated portion being sufficiently flexible to permit said catheter to be grasped through said cylindrical portion by pinching the cylindrical portion between the thumb and forefinger to collapse the wall of the cylindrical portion against the catheter and to provide a feel of the catheter through the wall of said cylindrical portion, said cylindrical portion being sufficiently resilient to return to its cylindrical shape after the pinching stress on the cylindrical portion has been removed.

4,051,850

DISPOSABLE MEDICAMENT INJECTOR

Edward A. Tischlinger, 7 Froghollow Road, East Lyme, Conn. 06333

Filed Nov. 21, 1975, Ser. No. 634,034
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 NV 5 Claims



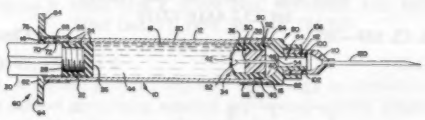
1. A disposable medicament unit comprising:
a cylindrical barrel having inner and outer surfaces and open on both its front and rear ends,
a plunger slidably carried in the rear end of the barrel in sealingly relation to the inner surface of the barrel,
a diaphragm assembly fixedly mounted in the forward end of the barrel, said diaphragm assembly including a hollow body portion having inner and outer surfaces, said hollow body portion fitting within the cylindrical barrel with its outer surface sealingly engaging the inner surface of said cylindrical barrel, a flexible wall closing off one side of the body portion to form a medicament chamber between the plunger and the flexible wall, a needle supported by the hollow body portion, said needle being spaced from the flexible wall and outside the medicament chamber, said needle being adapted to pierce the flexible wall when said wall is flexed into contact therewith to establish fluid communication between the medicament chamber and the needle,
a nose cap assembly fitting on the forward end of the barrel, and
a finger grip assembly on a rear end portion of the cylindrical barrel, and the finger grip assembly comprises a body portion with finger gripping elements extending outwardly therefrom and an inner and an outer wall extending forwardly from said body and spaced from each other so as to snugly receive the rear end portion of the barrel therebetween.

4,051,851

DIAPHRAGM ASSEMBLY FOR A MEDICAMENT DISPENSING UNIT

Edward A. Tischlinger, 7 Froghollow Road, East Lyme, Conn. 06333

Filed Mar. 31, 1976, Ser. No. 672,392
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 NV 4 Claims



1. In a medicament dispenser comprising a cylindrical barrel having a front and a rear end, a plunger slidably carried in the rear end of the barrel to sealingly close off the rear end of the barrel, a diaphragm assembly mounted in the front end of the barrel to close off that end of the barrel, the improvement residing in the diaphragm assembly which assembly comprises a body sized to sealingly fit within the barrel, said body having a hollow portion facing the rear end of the barrel, a flexible wall closing off the hollow portion to form a medicament chamber between said flexible wall and the plunger, a needle monted by means fitted within the diaphragm body and carried by the body with its end spaced from the flexible wall, said needle being spaced from the flexible wall and adapted to

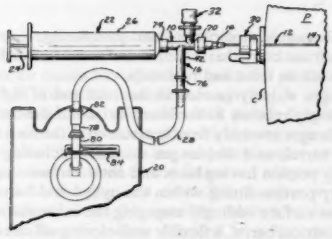
pierce the flexible wall said wall is flexed inwardly under the action of the moving plunger to establish fluid communication between the medicament chamber and the needle.

4,051,852

ASPIRATING DEVICE

Frank K. Villari, Oak Park, Ill., assignor to The Kendall Company, Boston, Mass.

Filed June 26, 1975, Ser. No. 590,786
Int. Cl.[2] A61M *1/00*
U.S. Cl. 128—278 **21 Claims**



1. A device for aspirating body fluids, comprising:

a valve assembly having a first port to receive body fluids, a second port for passage of the body fluids from the valve assembly, a passageway communicating between the first and second ports, one-way valve means associated with the passageway to permit passage of body fluids from the first port to the second port and prevent passage of body fluids from the second port to the first port, a third port, a second passageway communicating between the third port and the first passageway intermediate said valve means and second port, and second one-way valve means associated with the second passageway permitting passage of body fluids from the first passageway to the third port and preventing passage of fluids from the third port to the first passageway;

port means communicating with the passageway intermediate said valve means and first port, said port means being normally closed to prevent contamination of the device, and being openable to permit passage of fluid through the port means to the first port; and

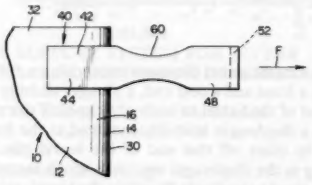
pump means communicating with said second port for aspirating the body fluids through the valve assembly.

4,051,853

DIAPER WITH EXTENSIBLE FASTENER

Francis L. Egan, Jr., Arlington Heights, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Aug. 9, 1976, Ser. No. 712,612
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—287 **7 Claims**



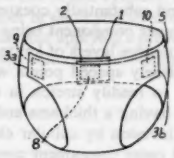
1. A disposable diaper comprising, an absorbent pad assembly, and a tape fastener comprising an elongated pressure-sensitive tape strip having a first section attached to a surface defined by a sheet of the pad assembly and a second securement section extending from the first section in a longitudinal direction of the tape strip for securing the diaper about an infant, said tape strip having means for extending and elongating in length previous to failure of said sheet when forces are applied in a longitudinal direction of the strip comprising an adhesively coated backing of a non-reinforced, extensible, polymeric film, with said film having an ultimate elongation of greater than 50% in the longitudinal direction of the tape strip, and having modulus properties such that said film has an elongation of 50% at 5–10 lbs/in. width of force as applied to the second section of the tape strip in the longitudinal direction thereof.

4,051,854

DIAPER PANTIES FOR BABIES

Gabrielle Leonie Aaron, Paris, France, assignor to Anciens Etablissements Rene Aaron, Paris, France

Filed Jan. 20, 1976, Ser. No. 650,624
Claims priority, application France, Jan. 24, 1975, 75.02209
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—284 **12 Claims**



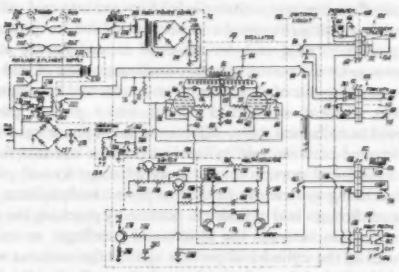
1. A diaper panty of the body comprising a piece of fabric material formed with a center flap having a first portion to be placed between the legs and a second portion at each end thereof to be turned upwardly around the body, an ear flap extending from each side of one of said portions of said center flap to be folded around the body to accommodate the body size and to be adjacent to said other second portion of said center flap, the entire outer surface of said piece of material having a raised fiber surface, and at least one fabric fastening member having fabric fastening means thereon complementary to the raised fiber surface of said piece of material and for direct attachment and fastening thereto to hold the ear flaps in a fixed position with respect to the center flap.

4,051,855

ELECTROSURGICAL UNIT

Max Schneiderman, Clifton, N.J., assignor to IPCO Hospital Supply Corporation, Whaledent International Division, New York, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,887
Int. Cl.[2] A61B *17/36*; A61N *3/00*
U.S. Cl. 128—303.14 **22 Claims**



1. An electrosurgical unit comprising:

vacuum tube oscillator means for providing an ungrounded output of a given frequency;

power supply means including a transformer for supplying said oscillator means with a high voltage;

coagulation output means for coupling to said oscillator means, and providing a coagulation signal for use in coagulation procedures;

cutting output means for coupling to said oscillator means, and providing a cutting signal for use in cutting procedures;

switching circuit means for selectively connecting said coagulation output means or said cutting output means to said oscillator means;

intensity control means for coupling to said power supply means, and varying the voltage supplied to said oscillator means, said intensity control means including a variable coil in parallel with said transformer for controlling the output voltage across said transformer;

modulation means for coupling to said oscillator means, and providing intermittent operation of said oscillator means, said modulation means including a multivibrator means, and coagulation level control means for varying the duty cycle of said multivibrator means;

and operation control means in said switching circuit means for interconnecting said intensity control means to said power supply means when said cutting output means is connected to said oscillator means, for interconnecting said modulation means to said oscillator means when said coagulation output means is connected to said oscillator means, and for disconnecting from said oscillator means one of said modulation means or said intensity control means when the other is connected thereto.

4,051,856

PNEUMATIC ROTARY CLASSIFIER

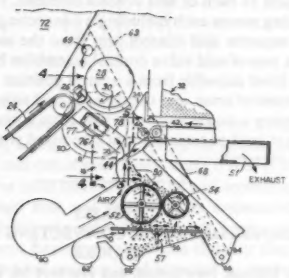
William B. Reed, and Floyd W. Bigsby, both of Saskatoon, Canada, assignors to Western Roto Thresh Ltd., Saskatoon, Canada

Continuation of Ser. No. 601,589, Aug. 4, 1975, abandoned, which is a continuation of Ser. No. 503,181, Sept. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 369,004, June 11, 1973, abandoned, which is a continuation of Ser. No. 222,084, Jan. 31, 1972, abandoned. This application Apr. 26, 1976, Ser. No. 680,447

Claims priority, application Canada, Nov. 22, 1971, 128236

Int. Cl.[2] A01F *12/18*

U.S. Cl. 130—27 HF **3 Claims**



1. In a threshing machine having a rotary threshing cylinder, concave and an associated deck, a cleaning and classifying device for aspirating or pneumatically separating chaff from grain comprising

a. panel means defining a vertically oriented throat disposed below said concave for passage of grain and chaff therethrough by gravity from said concave and deck;

b. a pneumatic separation area in said throat comprising an airflow channel disposed adjacent to and communicating with said throat and first fan means at the end of the passage remote from the throat which, provides airflow from the throat into the fan;

c. rotary screens and second fan means below said throat for further aspiration and mechanical separation of said chaff and grain;

d. elevating means for transferring cleaned grain to a hopper on the threshing machine and;

e. second elevating means for transferring uncleaned grain back to the rotary threshing cylinder for reclassification.

4,051,857

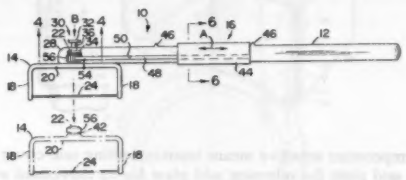
DENTAL FLOSS HOLDER

James B. Zambito, 1504 S. Arrawana, Tampa, Fla. 33609

Filed Aug. 26, 1976, Ser. No. 717,998

Int. Cl.[2] A61C *15/00*

U.S. Cl. 132—91 **2 Claims**



1. In a dental floss holder comprising a handle, a floss holding head attached to said handle, and connecting means attached to said handle, both said head and said connecting means being dimensioned and configured to be detachably connected to one another, the improvement comprising head positioning means mounted on said handle in movable, engaging relationship to said floss holding head, said head positioning means comprising sleeve means disposed in contiguous, sliding relationship around a predetermined segment of the outer surface of said handle; arm means formed on said sleeve means and extending forwardly therefrom in substantially parallel relationship to the longitudinal dimension of said handle; track means dimensioned and configured to receive said arm means therein formed on said handle; and a plurality of stop means formed on said handle in motion-limiting relation to said sleeve means; said arm means further comprising a plurality of teeth means formed on the forward end thereof in operative relation to a predetermined portion of said head, said head including a plurality of cog means formed on said predetermined portion, whereby longitudinal sliding of said sleeve means results in corresponding intermeshing of said teeth means and said cog means to angularly orient said head with respect to the longitudinal dimension of said handle.

4,051,858

SOLVENT SINK AND DISPENSER

Anthony P. Mele, 5316 E. Emile Zola, Scottsdale, Ariz. 85254

Filed Dec. 27, 1976, Ser. No. 754,505

Int. Cl.[2] B08B *3/02*

U.S. Cl. 134—56 R **7 Claims**

1. A solvent sink and dispenser comprising in combination:

a cabinet comprising an open top having a cover hingedly mounted along one of its top edges,

a two compartment sink mounted in a recessed manner within the top of said cabinet, each of the compartments having a drain in the bottom thereof,

a pair of fluid tanks mounted within said cabinet,

a pair of fluid dispensing heads mounted in said cabinet for dispensing fluid into either compartment of said sink,

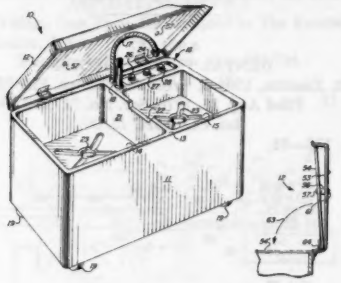
a conduit system including a first valve means for selectively connecting in a closed system either of said tanks to said dispensing heads from said heads into one or more of the compartments of said sink through its drain and back to a selected tank,

means for pressurizing said system,

a second valve means connected in said system for selec-

tively connecting said conduit system to a given one of said dispensing heads,

a fire resistant plate hingedly mounted on said cover for movement to and from said cover, and



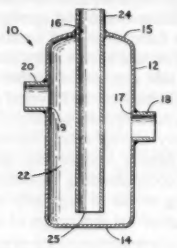
temperature sensitive means interconnecting said cover and said plate for releasing said plate for its movement away from said cover and over said sink when said cover is in an open position upon a fire occurring in said sink and effecting in a predetermined manner said temperature sensitive means.

4,051,859

APPARATUS FOR DRAINING FLUID FROM A CONTINUOUSLY EVACUATED SPACE

George John Hoffman, 37 Adrienne Place, Staten Island, N.Y. 10308

Filed Sept. 26, 1973, Ser. No. 400,735
Int. Cl.[2] B67D *5/54*
U.S. Cl. 137—154 **1 Claim**



1. Apparatus for draining fluid from a continuously evacuated space at first environmental pressure to a space at a second environmental pressure said second environmental pressure being relatively higher than said first environmental pressure, comprising:

collecting means in said continuously evacuated space at said first environmental pressure for collecting said fluid;

trap means, said trap means comprising; a casing defining a chamber therein said casing having a bottom wall and a top wall, a fluid inlet line extending into said chamber, to a discharge point substantially adjacent to said bottom wall, a fluid drain line extending out of said chamber, said fluid drain line disposed in said casing at a position above said discharge point of said fluid inlet line, and a gas bypass line extending out of said chamber, said gas bypass line disposed in said casing at a position above the position of said fluid drain line;

means for communicating said fluid inlet line to said collecting means;

means for communicating said fluid drain line to said space at said second environmental pressure;

means for communicating said fluid drain line to said gas bypass line; and

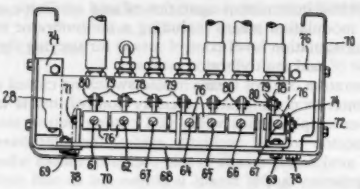
means for communicating said gas bypass line to said continuously evacuated space at said first environmental pressure.

4,051,860

VALVE CONTROL MECHANISM

Allyn C. Dowd, Sterling Heights, and Habibur Rahman, Detroit, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed Dec. 15, 1975, Ser. No. 640,809
Int. Cl.[2] E02F *3/85*; F16K *51/00*
U.S. Cl. 137—271 **9 Claims**



1. A valve control mechanism for a plurality of uniformly spaced valve control elements disposed in a common plane, comprising; a support structure adapted to be disposed in fixed relationship to said common plane, a pair of valve control assemblies, each of said valve control assemblies including mounting brackets which are relatively separable having a plurality of control arms pivotally mounted on one of said brackets and at least one arm on the other bracket with one of said control arms being associated with a respective control element, said control assemblies connected together to form a manifold assembly removably replaceable as a unit on said support structure, attaching means for connecting the mounting bracket of a selected one of said pair of valve control assemblies to said support structure, said attaching means being the sole means required to be removed to release said bracket containing said manifold assembly from said support structure, a connecting means on each of said control arms adapted for connection to each of said control elements, respectively, said connecting means each including a connecting element removable to separate said control arm from the associated control element, one of said valve control assemblies having a separate control lever movable from a neutral position for moving each of said control arms, and the other of said valve control assemblies having a single lever movable from a neutral position for moving at least one control arm associated with adjacent valve control elements.

4,051,861

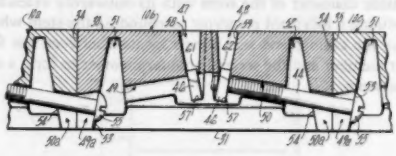
ARRANGEMENT FOR CONNECTING MANIFOLD BLOCKS

John E. Ellison, Newington, and Herbert M. Flink, East Hartford, both of Conn., assignors to Skinner Precision Industries, Inc., New Britain, Conn.

Filed Nov. 3, 1975, Ser. No. 628,379
Int. Cl.[2] F15B *13/08*
U.S. Cl. 137—315 **7 Claims**

1. For use in operatively mounting a plurality of fluid control valves, a combination comprising a pair of valve mounting manifold blocks adapted to be stacked in aligned end-to-end abutment, the manifold blocks each having fluid passage means therein for conducting fluid controlled by valves mounted on an upper surface of the block, one block having an upper opening therein intermediate the ends of the block, a longitudinally extending slot and an end opening in one end of said one block communicating with the slot, the upper opening of said

one block being accessible from its upper surface and intersecting the slot, the other block having a cavity and an opening in one end of said other block communicating with the cavity, the end openings in the blocks being registrable with one another when the blocks are in aligned end-to-end abutment, an elongated fastener having a head fixed on one end and an opposite threaded end, the fastener longitudinally extending from the



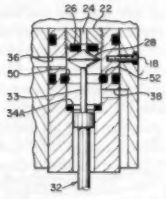
slot in said one block into the cavity of the other block with the head of the fastener disposed within said cavity, and a nut received within the upper opening of said one block for threaded engagement with the threaded end of the fastener at the juncture of the upper opening and the slot for compressively engaging the ends of the blocks in fixed relation to one another.

4,051,862

CONTROL VALVES

Harry M. Haytayan, Sunnyside Lane, Lincoln, Mass. 01773

Filed Dec. 15, 1975, Ser. No. 641,024
Int. Cl.² F15B *13/02*
U.S. Cl. 137—454.2 **14 Claims**



1. A control valve comprising:

a hollow valve casing having (1) a slide bore for a slide valve unit, (2) first, second and third ports for conducting flow of fluid into and out of said casing, and (3) first and second resilient valve seats surrounding first and second openings leading to said first and second ports respectively, said valve seats being aligned with said slide bore; and

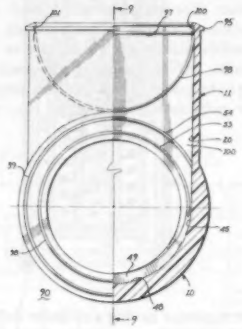
a slide valve unit having a valve stem slidably disposed in said slide bore and a valve head attached to the inner end of said stem and movable by said stem into engagement alternatively with said first and second valve seats, said valve head being generally diamond shaped in longitudinal section and being sized so that said valve head forms a close sliding fit with the surrounding portion of said casing, (2) fluid pressure applied via said first port and said first opening will force said valve member away from said first valve seat toward said second valve seat, (3) when it is engaged with either said first or second valve seat it will block flow of fluid through said first or second opening respectively, and (4) at all positions along its path of travel between the two valve seats it is incapable of blocking flow of fluid into or out of the casing via said third port.

4,051,863

GATE VALVE WITH REPLACEABLE LINER

Robert C. Still, Tucson, Ariz., assignor to New Concepts, Inc., Tucson, Ariz.

Continuation-in-part of Ser. No. 614,350, Sept. 17, 1975, Pat. No. 3,993,092. This application Aug. 23, 1976, Ser. No. 716,669
Int. Cl.² F16K *3/02*
U.S. Cl. 137—454.2 **10 Claims**



1. A gate valve having a positionable gate disposed therein for regulating the flow of fluid intermediate an attached pair of pipes, said gate valve comprising:

a. a gate having opposing surfaces and being positionable within said gate valve in a first and second position to open and close said gate valve and effect regulation of the flow of fluid;

b. a one piece pliant liner for receiving, guiding and seating and gate, said liner including:

i. a chest including a gate passageway with opposing side walls spaced from the opposing surfaces of said gate disposed therebetween;

ii. a ring defining a bore and extending downwardly from said chest in general planar alignment therewith;

iii. a depression disposed within said bore for defining a seat and a guide for said gate;

iv. first seal means disposed near the top of of the opposing side walls within said chest and being in sealing contact with said gate for preventing a flow of fluid through said gate passageway intermediate said chest and said gate;

v. second seal means disposed within said depression for preventing a flow of fluid through the bore of said ring on seating of said gate within said depression; and

vi. third seal means disposed on opposing side walls within said chest for sealing contact with the opposing surfaces of said gate for preventing a flow of fluid intermediate said chest and said gate when said gate is in the first position;

c. a pair of castings for receiving said liner, each of said castings including:

i. bore for receiving a part of said ring;

ii. a recess for receiving a part of said chest; and

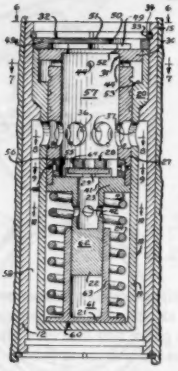
iii. attachment means for securing said pair of castings to one another to at least partially enclose said liner therebetween;

whereby , said liner includes seal means for precluding a flow of fluid intermediate said gate and said chest.

4,051,864
FLOW REGULATOR

Frank Iwatsuki, Evanston, Ill., assignor to Gould Inc., Cleveland, Ohio

Filed Oct. 21, 1975, Ser. No. 624,556
Int. Cl.[2] F16K 31/12
U.S. Cl. 137—504 15 Claims

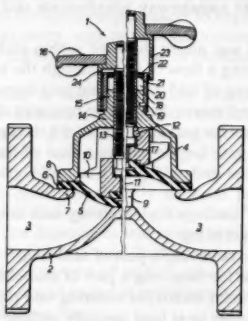


1. In a flow regulator having a cylinder defining an inlet and an outlet, and means for regulating fluid flow through the cylinder from said inlet to said outlet including a biased piston having an end portion adjacent said inlet movably received in the cylinder and variable flow passage means controlled by said piston for controlling flow of said fluid to said outlet, the improvement comprising: means defining a sensing orifice in said piston end portion for causing positioning of the piston in the cylinder as a function of a fluid pressure drop across said sensing orifice; a first dashpot in said cylinder for damping the movement of the piston caused by a change in fluid pressure across said sensing orifice, steady state flow of fluid through said flow passage means being controlled by said flow passage means independently of said dashpot; and a second dashpot in said cylinder for controlling movement of said piston.

4,051,865
FLUID FLOW CONTROL VALVES

Glyn Cocking, and John Owen Jones, both of Cwmbran, Wales, assignors to Saunders Valve Company Limited, Wales

Filed Feb. 27, 1976, Ser. No. 662,130
Claims priority, application United Kingdom, Mar. 6, 1975, 9452/75
Int. Cl.[2] F16K 31/50, 7/16
U.S. Cl. 137—556 7 Claims

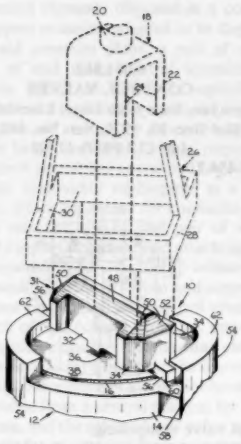


1. A fluid flow control valve comprising: a valve casing; an operating mechanism including an axially movable stem extending outwardly of the valve casing; a first annular member coupled to the valve casing and including a part extending from said casing co-axially with the stem outwardly beyond where said stem enters said casing; a second annular member coaxial with the stem and coupled to the stem, the first and second annular members being of such length as to axially overlap in all normal working positions of the stem; and the first annular member being of an inside diameter larger than the outside diameter of the stem with its outwardly extending part defining a lubricant reservoir surrounding the stem where it enters the casing; and seal means located between the first annular member and the second annular member to form a seal therebetween.

4,051,866
VALVE POSITIONING HANDLE

Earl A. Bake, Pittsburgh, and E. Frederick Schoenewels, Coraopolis, both of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 636,844, Dec. 2, 1975, abandoned. This application Oct. 8, 1976, Ser. No. 730,929
Int. Cl.[2] F16K 5/04
U.S. Cl. 137—556.3 13 Claims



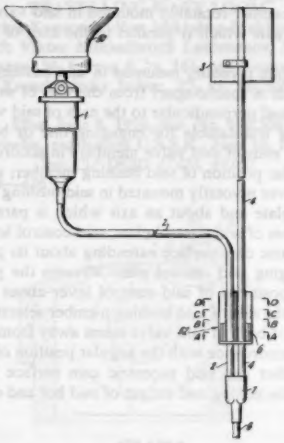
11. A valve positioning handle for a valve which valve includes a body member and a rotatable isolation member and is connectable to a distribution pipe member, at least one of said members being formed of plastic having a predetermined ultimate shear stress, said isolation member being disposed within said body member and rotatable about an axis to control the flow of fluid through said pipe member, said one of said members being capable of being destroyed or damaged if said ultimate shear stress is exceeded by the application of excessive forces thereto during rotation of said isolation member, said valve positioning handle comprising: an extended fitting having working surfaces thereon for receipt of at least one type of torque applying tool for rotating said isolation member; and a connecting section extending axially between said extended fitting and said isolation member, being formed of a preselected material and having predetermined crosssectional dimensions as measured in a plane which is perpendicular to said axis to insure failure by torsional shear generally along said plane prior to generation of said excessive forces to said one of said members by said torque applying tool.

4,051,867

MULTITUBE VALVE

Hans-Jürgen Forberg, Lensahn, Holst., Germany, assignor to Transcodan, Sven Husted-Andersen, Germany

Filed Mar. 1, 1976, Ser. No. 662,591
Claims priority, application Germany, Mar. 5, 1975, 2509485
Int. Cl.[2] F16L *55/14*
U.S. Cl. 137—595 11 Claims



1. A multiway valve for medical devices, chemical devices, etc. comprising a housing having an open front end and an open rear end, a plurality of tube channels defined between said front and rear ends through which individual tubes are adapted to be passed, each tube channel having a bottom tube support surface extending at least a portion of the distance between said front and rear ends and each having a second portion of the distance between said front and rear ends without a tube support surface so that the tube in the associated channel may be deflected below the level of said tube support surface, a clamp member movably mounted in said housing for movement backwardly and forwardly toward and away from each end of said housing and having a portion engageable with each tube when said clamp member overlies said tube at a place in which it is supported by said support surface, said clamp member being guided in said housing so that it is brought close enough to said support surface to compress the tube and at least reduce the flow therethrough, and guide means in said housing for guiding said clamp member for said backward and forward movement, said tube support surface in at least one of said channels is offset from said support surface of at least one of the other of said channels so that when said clamp member is positioned to close off at least a portion of the flow through one of the tubes it is located so that it does not effect the closing off of the cross-section of at least one of the other of said tubes, said clamp member being positionable in at least one position wherein at least one of said tubes is clamped off, in another position wherein at least two of said tubes are open and in a further position in which at least two of said tubes are shut off.

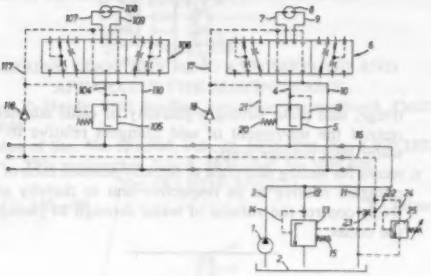
4,051,868

CONTROL DEVICE FOR A HYDRAULICALLY OPERATED CONSUMER

Hans Skov Andersen, Augustenborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed Mar. 23, 1976, Ser. No. 669,671
Claims priority, application Germany, Apr. 3, 1975, 2514624
Int. Cl.[2] F16K *11/00*
U.S. Cl. 137—596.13 5 Claims

1. A pressurized fluid distribution system comprising a plurality of control valve units, each of said units being for a hydraulically operated consumer unit and comprising a housing having a cylindrical bore, a spool type slide member slidably disposed in said bore, a plurality of operational ports in said housing opening into said bore, one of said ports being a supply port, two of said operational ports being first and second consumer unit ports on opposite sides of said supply port, two of said operational ports being return ports positioned outwardly from said supply port, two of said operational ports being first and second pressure sensing ports positioned outwardly from said return ports, conduit means in said housing connecting said first and second pressure sensing ports, said slide member having spools arranged to place said pressure sensing ports in fluid communication with said return ports when said slide member is in a neutral position, said spools being arranged to selectively pressurize either one of said consumer unit ports while exhausting the other one of said consumer unit ports, and said spools arranged to place said first pressure sensing port in fluid communication with said first



consumer port when it is being pressurized and place said second pressure sensing port in fluid communication with said second consumer port when it is being pressurized, a common supply line connected to said supply ports of said units, a common collecting sensing conduit connected to said pressure sensing ports of said units, a common return line connected to said return ports of said units, said control valve units being connected by said common supply line and said common collecting sensing conduit to a common differential pressure regulator, pressure relieving means to totally relieve the pressure in said common collecting sensing conduit when all of said control valve units are in their neutral operating states, and individual check valve means between said common collecting sensing conduit and the respective ones of said control ports of said control valve units to set the pressure in said common supply line so that the consumer unit with the highest load connected to any one of said control valve units receives an adequate predetermined pressure.

4,051,869

MIXING VALVE

James W. Holt, Brookland, and John K. Meeks, Jonesboro, both of Ark., assignors to Crane Co., New York, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,078
Int. Cl.[2] F16K *11/14*
U.S. Cl. 137—636.1 16 Claims

1. A mixing valve of the type having a single handle for controlling the volume and relative proportion of hot and cold water flowing through the valve including:

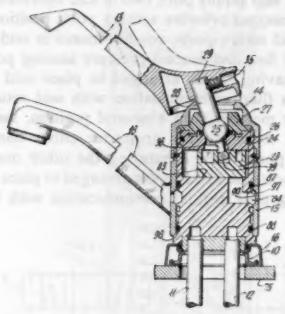
a. a housing adapted to receive a valve cartridge, said housing having a hot water inlet port a cold water inlet port and an outlet;

b. a valve cartridge positioned in said housing, said cartridge having a plurality of water inlet passages in communication with said inlet water ports, and, a seat in each water inlet passage;

c. a plunger positioned in each of said water inlet passages, said plunger adapted to be seated within its respective

water inlet passage and to be freely slidable therein whereby inlet water displaces said plunger from its respective seat;

d. a slider plate mounted above said plungers for sliding movement both radially and rotatably in a single plane with respect to the longitudinal axis of said valve cartridge, said plate having a plurality of cams adapted to restrict the movement of said plungers relative to said water inlet passage seats;



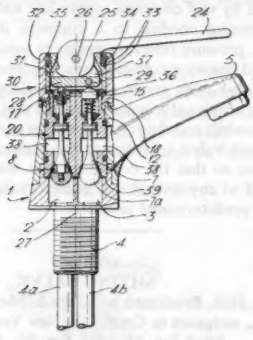
e. means for sliding said plate to thereby position each of said plungers relative to its respective seat to thereby selectively control the volume of water through its passage to the outlet.

4,051,870

SINGLE HANDLE MIXER VALVE

Lars Nordentoft, Menden, Germany, assignor to Friedrich Grohe Armaturenfabrik, Hemer, Germany

Filed Feb. 25, 1976, Ser. No. 661,349
Claims priority, application Germany, Feb. 28, 1975, 2508724
Int. Cl.[2] F16K *11/18*
U.S. Cl. 137—636.2 **3 Claims**



1. A mixer valve for mixing hot and cold water sources and providing an output thereof and under the control of a single lever comprising, in combination:

a valve housing;

first and second inlets on said housing for respectively receiving said sources and said inlets respectively communicating with first and second passageways in said housing;

a mixing chamber in said housing in which said first and second passageways terminate at restricted openings therein and said chamber having an outlet opening;

first and second valve members respectively disposed in said first and second passageways, each valve member having a stem extending through said chamber, through restricted bores in said housing and externally of said valve housing, and each valve member having a tapered configuration which reduces in the direction of said stem, wherein the restricted openings of said chamber form valve seats for receiving the tapered portions of said valve members in sealing relationship therewith;

means for yieldably urging said valve members toward said valve seats;

a valve cap removably mounted to said valve housing and surrounding the extended ends of said valve stems;

a bushing member rotatably mounted in said valve cap and about an axis which is parallel to the axes of said valve stems;

a control plate pivotally mounted in said bushing about an axis which is spaced-apart from the axis of said bushing member and perpendicular to the axes of said valve stems and being translatable for engaging one or both of the extended ends of said valve members in accordance with the angular position of said bushing member; and

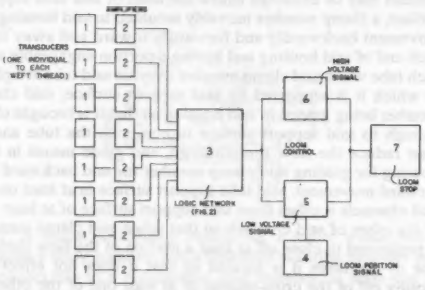
a control lever pivotally mounted in said bushing above said control plate and about an axis which is parallel to the pivotal axis of said control plate, said control lever having an eccentric cam surface extending about its pivotal axis for engaging said control plate wherein the plurality of angular positions of said control lever about its pivotal axis and the axis of said bushing member selectively translate one or both of said valve stems away from said valve seats in accordance with the angular position of said bushing member and said eccentric cam surface thereby to control the mixing and output of said hot and cold water.

4,051,871

ELECTRONIC DEVICE FOR CONTROLLING WEFT YARN INSERTION IN LOOMS

Sergio Vella, Biella (Vercelli), Italy, assignor to ROJ Electrotex S.p.A., Biella (Vercelli), Italy

Filed Apr. 30, 1975, Ser. No. 573,003
Claims priority, application Italy, Apr. 30, 1974, 22117/74
Int. Cl.[2] D03D *51/34*
U.S. Cl. 139—370.2 **6 Claims**



1. Electronic device for controlling weft yarn insertion in continuous weft feed looms, designed to stop the running of the loom and to provide a signal, whenever there is either breakage of a weft yarn or when a larger number of weft yarns than that scheduled, is inserted by mistake, characterized in that it comprises a plurality of transducers each activated by movement of a weft yarn and adapted to feed signals to a logic network when the yarn is in movement, there being a said transducer individual to each said weft yarn and means, downstream of said logic network, operated by the signals emitted by said network and adapted to activate a device for stopping the loom and providing a signal, said logic network comprising means for storing a predetermined law of insertion of the individual weft yarns corresponding to a certain weaving operation on the loom, and for comparing with said law the actual weft insertions detected by the transducers thereby to

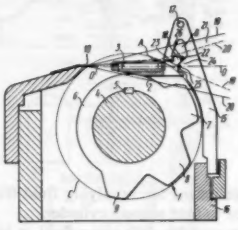
stop the loom not only when fewer than a predetermined number of weft yarns is inserted in the loom but also when more than said predetermined number of yarns is inserted in the loom.

4,051,872

TRAVELLING-WAVE LOOM

Jury Ivanovich Komarov, ulitsa Miklukho-Maklaya, 29, korpus 1, kv. 215; Viktor Mikhailovich Lukhmanov, Nagatinskaya naberezhnaya, 14, korpus 4, kv. 161, and Gennady Ivanovich Kovalev, Kronshtadtsky bulvar, 27, kv. 85, all of Moscow, U.S.S.R.

Filed June 9, 1976, Ser. No. 694,326
Claims priority, application U.S.S.R., June 16, 1975, 2144375
Int. Cl.[2] D03D *47/26, 49/60*
U.S. Cl. 139—436 3 Claims



1. A travelling-wave loom comprising: a cloth-forming mechanism composed of a rotary reed and a separating grate; disks with teeth forming the rotary reed of said cloth-forming mechanism, the crests thereof tracing out a trajectory with the disks rotating; plates forming a separating grate of said cloth-forming mechanism and having recesses forming a tunnel of the separating grate; weft thread carriers flying through the shed of the warp threads, each of the carriers having an abutment extending into said tunnel for partially accommodating each carrier in the tunnel of the separating grate and each carrier being provided with a side wall facing the plates of said separating grate, the latter plates respectively terminating on one side of the abutment of each carrier in a free end situated adjacent a top surface of each carrier, said carriers cooperating with one of the teeth of the disks of the rotary reed for accomplishing said flight through the shed; a groove being formed in each of said weft thread-carriers on the side wall thereof facing said plates of the separating grate; a projection on each of said plates of the separating grate engaging said groove of said weft thread carriers and having an end disposed as close as possible to the trajectories circumscribed by the crests of the teeth of said disks of the rotary reed so that with the disks rotating the teeth thereof are clear of said projections of the plates.

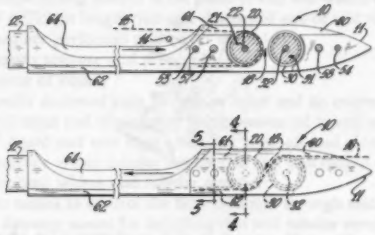
4,051,873

WEFT YARN CARRIER

Maurice J. Detonnancourt, Lincoln, R.I., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Dec. 2, 1976, Ser. No. 746,929
Int. Cl.[2] D03D *47/02*
U.S. Cl. 139—440 4 Claims

1. In a carrier for inserting weft yarn into a shed formed between warp yarns on a loom wherein the weft yarn is continuously supplied from a source located outside of the shed and is inserted into the shed by a carrier attached to a reciprocable inserter, the improvement comprising a pair of rotatably mounted pulleys positioned in said carrier, the first of said pulleys being adapted for contact with said weft yarn during motion of the carrier in a first direction, the second of said



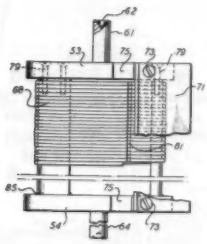
pulleys being adapted for contact with the weft yarn during motion of the carrier in a second opposite direction.

4,051,874

SPRING LOOP KEY RING AND METHOD AND APPARATUS FOR MAKING SAME

Gilbert F. Hardy, 8191 Sterling Ave., Huntington Beach, Calif. 92646

Division of Ser. No. 551,900, Feb. 21, 1975, Pat. No. 3,970,227.
This application July 9, 1976, Ser. No. 703,806
Int. Cl.[2] B21F *37/02*
U.S. Cl. 140—88 5 Claims



1. Apparatus for making a key keeper having separated small and large half loops connected by straight, tangentially oriented side rods and comprising a semi-cylindrical first arbor, a semi-cylindrical second arbor parallel to the first arbor, means spacing the two arbors, pivot means fixed to the spacing means, and a clamp bar removably secured to the spacing means.

4,051,875

CONDUCTOR WRAPPING BIT

William J. Baker, and Clifford L. Galloup, both of Reed City, Mich., assignors to Gardner-Denver Company, Dallas, Tex.

Filed Jan. 31, 1977, Ser. No. 763,948
Int. Cl.[2] B21F *15/00;* B25F *1/00;* H02G *1/12*
U.S. Cl. 140—124 8 Claims

1. A bit rotatable about a longitudinal axis for wrapping a flexible insulated conductor wire about a terminal in a series of helical convolutions comprising:

an end face;

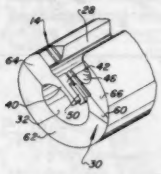
a terminal receiving bore in said end face;

a longitudinal conductor wire receiving groove in said bit and opening at one end to said end face;

means forming a surface extending substantially transversely with respect to said axis across the opening of said groove to said end face for guiding and supporting said conductor wire after it is withdrawn from said groove; and,

means forming a cutting edge disposed along said surface

and extending in a substantially transverse direction with respect to said axis for continuously slitting the insulation of said conductor wire in a substantially longitudinal



direction with respect to said conductor wire after said conductor wire is withdrawn from said groove and before said conductor wire is wrapped on a terminal.

4,051,876

MANUFACTURE OF TUBULAR TYPE BATTERY PLATES

Stanley Charles Foulkes, Deane, England, assignor to Chloride Group Limited, London, England

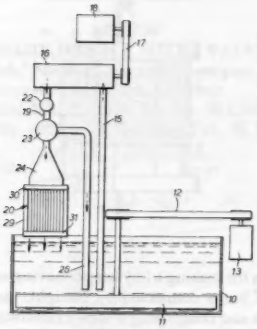
Filed Dec. 22, 1975, Ser. No. 642,734

The portion of the term of this patent subsequent to May 3, 1974, has been disclaimed.

Claims priority, application United Kingdom, Dec. 23, 1974, 40952/74; Oct. 15, 1975, 42361/75

Int. Cl.² B65B *1/04*

U.S. Cl. 141—1.1 **11 Claims**



1. A method for preparing enveloped plates for batteries by introducing an active material composition containing liquids into the porous envelope of the plate, when the envelope is assembled on the current conducting element of the plate, characterized by using an active material composition which is an alkaline active material composition wherein the composition is introduced into said envelope as a slurry having a rotating vane viscometer torque value of less than 0.006 lbs. ft. at 20° C, and after the envelope has filled, the back pressure in the supply of slurry to the envelope is allowed to build up to a pressure above 5 p.s.i. but not in excess of 100 p.s.i. and the pressure thereafter being released.

4,051,877

GAS COMPRESSION APPARATUS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an investment of Leslie S. Terp, Scottsdale, Ariz.

Filed Oct. 24, 1975, Ser. No. 625,734

Int. Cl.² B65B *57/00*; F04B *17/00*

U.S. Cl. 141—4 **16 Claims**

5. Apparatus for transferring fluid from a low pressure to a higher pressure comprising:

a. a source of fluid under low pressure;

b. a receiver for receiving fluid under high pressure;

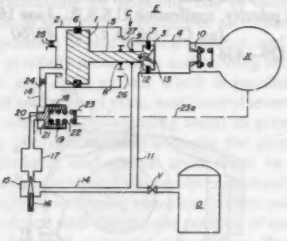
c. a first cylinder adapted to receive fluid from said low pressure source;

d. a second cylinder, of smaller diameter an said first cylinder, adapted to receive fluid from said low pressure source and to deliver fluid to said receiver at a high pressure;

e. first and second pistons rigidly connected to each other by a rod and adapted to reciprocate simultaneously within said first and second cylinders respectively;

f. first vent means in said first cylinder and located on the rod side of said first piston for continuous communication with the ambient environment;

g. first conduit means for supplying fluid from said low pressure source to said first cylinder;



h. second conduit means for supplying fluid from said low pressure source to said second cylinder;

i. third conduit means for delivering fluid at high pressure from said second cylinder to said receiver;

j. capacitance means located in said first conduit means for receiving and storing fluid at low pressure;

k. control means located between said capacitance means and said first cylinder and responsive to the pressure within said capacitance means and said receiver for intermittently releasing fluid from said capacitance means for expansion against the face of said first piston; and,

l. second vent means in said first cylinder and located on the face side of said first piston for exhausting said intermittently introduced fluid after expansion against the face of said piston.

4,051,878

ROTARY FILLER APPARATUS

Peter M. Ohmeis, Monroe; Robert L. Gehring, Sloatsburg, and Roger A. Hahn, Warwick, all of N.Y., assignors to Avon Products, Inc., Suffern, N.Y.

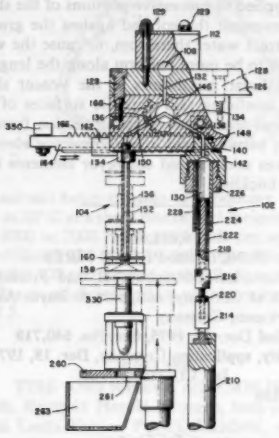
Continuation of Ser. No. 439,533, Feb. 4, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,695

Int. Cl.² B65B *3/12, 43/42*

U.S. Cl. 141—82 **2 Claims**

1. A filling apparatus for filling one after another a plurality of molds comprising a substantially continuous flow of molds with fluid material of the type which tends rapidly to set up and/or settle when not subject substantially constantly to flowing movement, said filling apparatus comprising a manifold, said manifold including an inlet to and an outlet from an elongated path, means for connecting a source of fluid material both to said inlet and said outlet whereby said fluid material after flow through an elongated path returns to said source, said connecting means including means for continuously flowing said fluid material into said inlet; at least one filling module including a stem having an inlet and an outlet, a cylinder, a piston movable in said cylinder in opposite directions between a pair of limit positions, passage means providing fluid connection between said elongated path, said inlet of said stem and said cylinder, said passage means including a cylindrical opening and having three paths directed radially of said opening at substantially equidistant spacing therearound, and wherein a first of said paths is connected to said elongated path, while a second of said paths is connected to said cylinder and a third of

said paths is connected to said stem, and a valve, said valve received in and rotatable about said cylindrical opening, said valve having internal passage means providing fluid connection between selected pairs of said first, second and third paths; means controlling the movment both of said piston in said cylinder and said valve in said cylindrical opening, said controlling means functioning when said piston moves in a cylinder charging direction to provide a fluid flow through said first



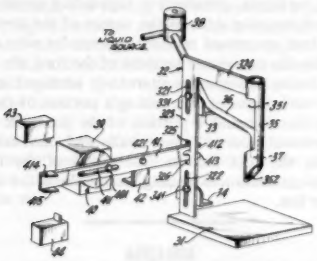
and second paths and when said piston moves in a cylinder discharging direction to provide a fluid flow through said second and third paths; means for supporting each said mold to be filled; and means for moving one of said support means and filling module relative to the other so that during filling of each said mold said outlet of said stem moves upwardly toward the opening of said mold, yet remains beneath the surface of said fluid material in said mold as said mold is filled.

4,051,879

APPARATUS FOR POURING LIQUID IN CUPS

Katsunari Itagaki, Azuma, Japan, assignor to Sankyo Electric Company Limited, Isesaki, Japan

Filed June 15, 1976, Ser. No. 696,393
Int. Cl.² B65B 3/34
U.S. Cl. 141—329 **7 Claims**



1. Apparatus for automatically perforating a cover of a container and pouring a predetermined quantity of liquid into said container including:

means to support said container in a predetermined position;

a movable tubular member having a longitudinal axis disposed substantially perpendicularly to said cover of said container when said container is in said predetermined position, said tubular member having a sharpened end disposed adjacent to said cover and an elongated longitudinal aperture;

driving means to move said tubular member in a continuous reciprocating motion in the place of said axis with a stroke of sufficient length that said sharpened end of said tubular member perforates said cover of said cup;

means to activate said driving means;

a source of liquid;

a fixedly mounted pipe having an input and an output end, said input end of said pipe being connected to said source of liquid and said pipe extending through said elongated aperture in said tubular member so that said output end is disposed within said tubular member;

valve means to control the flow of liquid through said pipe;

first detector means for detecting that said tubular member is at a first predetermined position perforating the cover of said container;

timer means responsive to said first detector means to open said valve means for a predetermined period permitting the flow of liquid from the output end of said pipe;

second detector means for detecting that said tubular member is at a second predetermined position spaced from the cover of said container; and

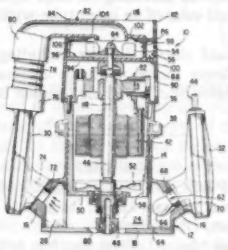
means responsive to said second detector means to deactivate said driving means.

4,051,880

DUSTLESS ROUTERS

Charles E. Hestily, Greenville, S.C., assignor to The Singer Company, New York, N.Y.

Filed Oct. 29, 1976, Ser. No. 736,916
Int. Cl.² B27G 71/00
U.S. Cl. 144—252 R **10 Claims**



1. A dustless portable electric router comprising:

a. a base having a dust chamber formed therein,

b. a handle connected to the base,

c. a passage formed in the handle in communication with the dust chamber,

d. a motor mounted to the base to be axially adjustable therein,

e. the motor having a shaft therein rotatable to actuate the router,

f. a blower having a rotor affixed to and rotatively driven by the motor shaft,

g. a conduit interconnecting the handle passage to the blower whereby dust and debris collected in the dust chamber will be drawn into and discharged from the blower, and

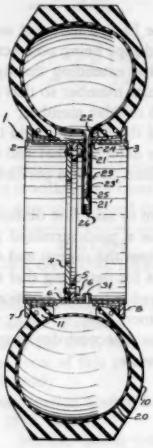
h. a dust bag connected to the blower to collect the blower discharge.

4,051,881

CURING RIM

Harold Severin Peterson, Fargo, N. Dak., assignor to Applied Power Inc., Milwaukee, Wis.

Filed Mar. 15, 1976, Ser. No. 666,607
Int. Cl.² B25H *1/00*
U.S. Cl. 144—288 A **9 Claims**



1. A rim for supporting a vehicle tire during a curing operation comprising:

a pair of sleeves adapted to be secured in an end to end relationship;

said sleeves including attachment means to secure said sleeves for support of a vehicle tire during a curing operation;

sealing means operatively coupled to said sleeves to retain a vehicle tire in sealed relation on the periphery of said sleeves;

one of said sleeves including an inlet opening therein for receiving said stem of an inner tube within a vehicle tire; and

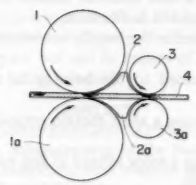
said one of said sleeves further including a second inlet therein defining means applying a pressurized fluid between the interior of a vehicle tire and the exterior of an inner tube.

4,051,882

METHOD OF PROCESSING UNDRIED VENEER SHEET

Katsuji Hasegawa, Nagoya, Japan, assignor to Meinan Machinery Works, Inc., Ohbu, Japan

Filed Mar. 17, 1976, Ser. No. 667,848
Int. Cl.² B27M *1/02*
U.S. Cl. 144—309 D **5 Claims**



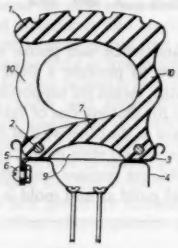
1. A method of processing an undried wood veneer sheet in order to reduce the water content of said sheet and improve its dry-ability, which comprises the steps of: continuously moving said undried veneer sheet in a direction against the grain of said sheet by drivingly contacting the opposite surfaces of said sheet by infeed conveyor elements which are continuously moving at a first predetermined speed in said direction and simultaneously drivingly contacting the opposite surfaces of said sheet by outfeed conveyor elements located at positions close to and downstream of the positions at which said infeed conveyor elements drivingly contact said sheet, said outfeed conveyor elements continuously moving in said direction at a second predetermined speed which is slower than said first predetermined speed so that a uniform compression force is continuously applied to successive portions of the sheet in the direction of movement thereof and against the grain thereof sufficient to extract water therefrom, to cause the water content of the sheet to be more uniform along the length thereof and to break tubular membranes in the veneer sheets; and simultaneously confining said opposite surfaces of the sheet against movement transverse to said direction from the time the sheet enters between said infeed conveyor elements until the time it leaves said outfeed conveyor elements to prevent the sheet from buckling.

4,051,883

PUNCTURE-PROOF TIRES

Jakob Ippen, Leverkusen-Steinbuechel, and Friedel Stuttgen, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 15, 1975, Ser. No. 640,719
Claims priority, application Germany, Dec. 19, 1974, 2460051
Int. Cl.² B60C *7/08*
U.S. Cl. 152—324 **3 Claims**



1. A vehicle tire comprising an outer tread element, a foot adapted to contact a wheel felly, the foot having two peripherally-disposed outer portions, a resilient connecting portion connecting the tread element and the foot, the connecting portion comprising a plurality of radially and evenly spaced supporting members, consecutive supporting members being arranged on opposite sides of the center of the tire, the foot comprises two unstressed reinforcing circular wire cores disposed within the two outer portions of the foot, the tire comprises a plurality of segments alternately arranged in opposite directions, each segment comprising a portion of the tread, a supporting member and a portion of the foot, the segments having concavely curved inner walls and convexly curved outer walls, the foot has an indentation of the inner side thereof, the indentation extending around the entire circumference of the tire.

4,051,884

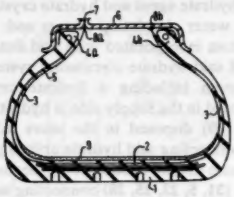
PNEUMATIC TIRE CONTAINING GEL LUBRICANT

Alan John Bourne, Sutton Coldfield, and Trevor John Walton, Tamworth, both of England, assignors to Dunlop Limited, London, England

Filed Nov. 24, 1975, Ser. No. 634,847
Claims priority, application United Kingdom, Dec. 4, 1974, 52342/74; Aug. 19, 1975, 34509/75
Int. Cl.² B60C *17/00, 21/08*
U.S. Cl. 152—330 L **37 Claims**

1. A pneumatic tire having on its internal surface a coating of

a lubricant gel having a viscosity and mechanical stability such that it remains on the tire surface and does not flow when the tire is in normal use in an inflated tire and wheel assembly, said gel comprising a poly(alkylene oxide) lubricant gelled with a finely divided silica having a surface area above 150 square meters/gram and a gel-strengthening amount of an ionic salt having a pH in the range 5.5 to 8.5 when in a 0.1 molar aqueous



solution, said salt being capable of producing a gel viscosity (measured at 20° C at a shear rate of 0.31 reciprocal seconds) in the range 3000 to 7000 Newton.seconds per square meter by mixing 2 milliliters of a suitably concentrated aqueous solution of the salt with 100 grams of the poly(alkylene oxide) lubricant and the silica in a lubricant:silica weight ratio of not greater than 92.5:7.5.

4,051,885

TIRE AND WHEEL ASSEMBLIES

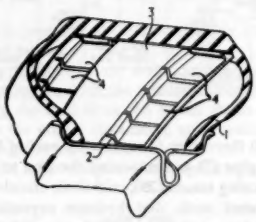
Tom French; Reginald Harold Edwards, both of Sutton Coldfield, and Leslie Vernon Powell, Lichfield, all of England, assignors to Dunlop Holdings Limited, London, England

Continuation of Ser. No. 150,627, June 7, 1971, abandoned. This application Nov. 6, 1975, Ser. No. 629,522

Claims priority, application United Kingdom, June 20, 1970, 30027/70

Int. Cl.² B60C *17/00, 17/04*

U.S. Cl. 152—330 L **16 Claims**



1. A pneumatic tire having a tread area and a pair of sidewalls defining an interior surface, each sidewall having an annular bead and having attached to but separate from its interior surface a closed enclosing means extending around the circumference of the tire in a position opposite said beads and containing a lubricant for the interior surfaces of the tire, means for releasing said lubricant from said enclosing means onto the interior surfaces of the tire which contact each other upon substantial under-inflation or deflation of the tire to facilitate relative movement between the contacting interior surfaces of the tire.

4,051,886

SATURATED LIQUID/VAPOR GENERATING AND DISPENSING

Edward Alan Ross, Willowdale, Canada, assignor to Liquid Carbonic Canada Ltd., Canada

Division of Ser. No. 392,080, Aug. 27, 1973. This application Mar. 1, 1976, Ser. No. 662,896

Int. Cl.² B22C *9/14*

U.S. Cl. 164—16 **26 Claims**

1. A method of making a number of foundry cores serially in which a foundry aggregate mixed with a curable binder is introduced into a core box cavity to form each green core and each green core is gassed by passing into it a predetermined dose of a vapor under pressure of a normally liquid curing agent for the binder and an inert carrier gas and then a purging gas is passed through the core to drive out unreacted curing agent, the improvement comprising,

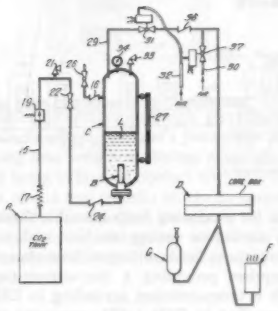
providing a supply of said liquid agent and an overlying supply of vapor in a pressure vessel under a predetermined pressure,

gassing a plurality of cores in series by dispensing vapor from the vapor space in a continuous series of intermittent bursts one to each core in succession, each burst producing a pressure drop within the vessel intervened by a short nondispensing period,

during each nondispensing period, flushing through each core a purging gas,

responsive immediately to the pressure drop caused by each burst introducing carrier gas under pressure into a bottom zone of the vessel during each burst and following nondispensing period until equilibrium pressure is restored therein and the vapor lost in said burst is replaced,

finely dividing said carrier gas as it is introduced to form in said liquid a mass of minute bubbles effective to provide intimate contact between gas and liquid whereby a saturated vapor is formed to the exclusion of entrained liquid and conveyed to the vapor space during each nondispensing period,



maintaining a relationship between the depth of the vapor space, the head of liquid above the introduction zone, the relative volume of each burst to that of the vapor space, the frequency of the bursts, and the initial size of the bubbles so as to ensure the presence in the vapor space of a true saturated vapor substantially free of entrained liquid.

23. An apparatus for the gassing of cold box cores with the saturated vapor in a carrier gas of a curing substance which is normally liquid at ambient temperatures, comprising,

a cold box having a core cavity for a core of finely divided aggregate and curable binder,

a pressure vessel for containing a body of liquid covered by an atmosphere of saturated vapor of a normally liquid curing substance under pressure,

a vapor-dispensing communication from an upper position in the vapor space in the vessel leading to the core cavity,

means for controlling the vapor-dispensing communication whereby saturated vapor of a curing agent for said binder is dispensed from the vessel in bursts of predetermined size,

near the bottom of the liquid space in the vessel a partition of a porous medium having in contact with the liquid an extensive surface having pores of mean diameter not greater than about 10 microns,

a source of carrier gas under pressure and communication therefrom to the side of the partition remote from the liquid,

a source of purging gas under pressure and a purging gas communication therefrom to the core cavity,

means for controlling the purging gas communication whereby purging gas is supplied to the core cavity in predetermined amount,

timing means for synchronizing the means for controlling the vapor communication with the means for controlling the purging gas communication, whereby, in a continuous cycle, an amount of vapor is dispensed effective to cure the core and immediately following an amount of purging gas is dispensed effectively to purge the core,

means for regulating the pressure of the carrier gas supplied to a predetermined pressure whereby gas of substantially said pressure is passed through the partition to the liquid to form bubbles, responsive immediately to the pressure drop caused by the dispensing of each burst of vapor until equilibrium pressure is restored and the vapor lost in said burst is replaced by the introduction of additional gas.

4,051,887

PROCESS FOR PRODUCING SHEETS AND STRIP OF ZINC-COPPER-TITANIUM ALLOY

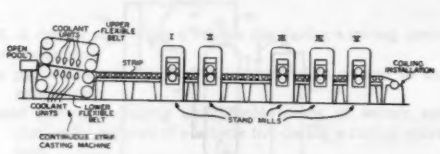
Volker Groth, Olfen; Adolf Stradmann, Datteln, and Erich Pelzel, Puchheim, all of Germany, assignors to Rheinisches Zinkwalzwerk GmbH & Co. KG, Datteln, Germany

Filed Mar. 8, 1976, Ser. No. 664,728

Claims priority, application Germany, Mar. 13, 1975, 2510985

Int. Cl.² B22D *11/12*

U.S. Cl. 164—76 **5 Claims**



1. Process for producing deep-drawable sheets and strip by means of a continuous casting machine with moving flexible belts and continuous finish-rolling without change of direction, which comprises providing a zinc-copper-titanium rolling alloy which is creep-resistant according to DIN 17 770 and foldable according to DIN 1 623, consisting of 1.5 to 5.5% copper, 0.05 to 0.25% titanium and balance zinc, wherein an increase in copper content is accompanied by a decrease in titanium content, continuously casting the zinc-copper titanium alloy having a thickness of 6-24 mm and an effective width up to 2000 mm causing the slab to solidify simultaneously and uniformly from both sides at a constant volumetric solidification rate, and subsequently hot-rolling said slab at a temperature above 100° C in at least three, passes, each of which results in an effective reduction in cross-section not in excess of 80%.

4,051,888

LOW TEMPERATURE ENERGY CARRYING APPARATUS AND METHOD

Tatsunori Yamada, Kyoto; Shigeru Mori, Sakai; Kaoru Kato, Hirakata; Yasuyuki Arai, Osaka, and Katumi Sakitani, Kawachinagano, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

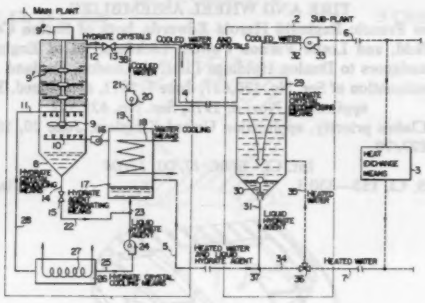
Continuation-in-part of Ser. No. 485,998, July 5, 1974, abandoned. This application Jan. 5, 1976, Ser. No. 646,833

Claims priority, application Japan, July 7, 1973, 48-76751

Int. Cl.² F28D *15/00*

U.S. Cl. 165—1 **7 Claims**

1. A low temperature energy carrying apparatus comprising: a first water circulating system including a hydrate agent separating means (17) in which the hydrate agent is CH_3H_8, $CHFCl_2$, $CFCl_3$, CO_2, CF_3Br, n-C_4H_{10} or i-C_4H_{10} disposed in the side of low temperature energy supply and having a water cooling means (18), at least one heat exchange means (3) disposed in the side of users, feed conduit means (19, 21, 4, 32, 6) connecting said hydrate agent separating means (17) to said heat exchange means, return conduit means (7, 34, 5) connecting said heat exchange means (3) to said hydrate agent separating means (17), and a pump means (20) disposed in said feed conduit means (19, 21); a hydrate circulating system for circulating a liquid hydrate agent and hydrate crystals incorporated with said first water circulating system and: a second water circulating system incorporated with said first water circulating system and said hydrate circulating system; said hydrate circulating system including a hydrate crystal producing means (8) disposed in the supply side, a hydrate crystal decomposing means (29) disposed in the users side, feed conduit means (12, 4) connecting said hydrate crystal producing means (8) to said hydrate crystal decomposing means (29), and return conduit means (31, 5, 23, 25, 28) connecting said hydrate crystal decomposing means (29) through said hydrate agent separating means (17) to said hydrate crystal producing means (8), said second water circulating system including said hydrate crystal decomposing means (29) and said heat exchange means (3) disposed in the users side, food conduit means (32, 6) connecting said hydrate crystal decomposing means (29) to said heat exchange means (3), and return conduit means (7, 25) connecting said heat exchange means (3) to said hydrate crystal decomposing means (29) and including a pipe (7) and a

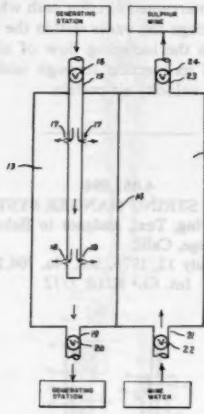


branch pipe (35) therefrom for receiving part of heated water flowing in said pipe (7) and returning the part to said hydrate crystal decomposing means (29), said three circulating systems being incorporated such that hydrate crystals discharged through said feed conduit means (12) from said hydrate crystal producing means (8) are mixed with cooled water from said hydrate separating means (17) at at least several percent thereof and are fed through said feed conduit means (4) to said hydrate crystal decomposing means (29) and then said hydrate crystals decompose in said hydrate crystal decomposing means (29) to effect cooling of said part of heated water returned through said return conduit means (7, 35) from said heat exchange means (3) by absorbing latent heat upon decomposition, said cooled water being fed through said feed conduit means (32, 6) to said heat exchange means (3) together with said cooled water from said hydrate agent separating means (17), while liquid hydrate agent formed in said hydrate crystal decomposing means (29) is returned through said return conduit means (31, 5) to said hydrate agent separating means (17) together with the remaining part of heated water from said heat exchange means (3), said liquid hydrate agent being separated from said heated water in said hydrate agent separating means (17) and returned through said return conduit means (23, 25, 28) to said hydrate crystal producing means (8), and further said pump means (20) allowing the pressure in said hydrate circulating system to be maintained in the liquid phase area of said hydrate agent.

4,051,889
HEATING FRASCH SULPHUR MINE WATER USING WASTE HEAT

Xerxes T. Stoddard, 4617 W. 27th Ave., Denver, Colo. 80212, and Ruel C. Terry, 3090 S. High St., Denver, Colo. 80210

Filed Mar. 26, 1976, Ser. No. 670,986
Int. Cl.[2] F28D *17/00*
U.S. Cl. 165—1 8 Claims



1. A method of coupling a steam-electric generating station to a Frasch process sulphur mine so that a portion of the waste heat from electric generation can be used in the process of mining sulfur, comprising the steps of

establishing a coupling heat exchange means,

diverting exhaust steam from the steam-electric generating plant into the coupling heat exchange means,

circulating mine water through the coupling heat exchange means,

reducing the pressure of the steam within the coupling heat exchange means,

condensing the steam into water within the coupling heat exchange means with the resultant liberation of heat,

transferring the heat from the hotter steam and condensed steam to the cooler circulating mine water,

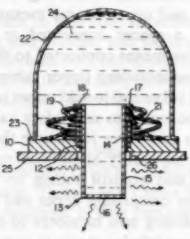
withdrawing the mine water, and

directing the mine water to the sulphur mine.

4,051,890
DIRECTIONAL HEAT TRANSFER UNIT

August S. Melchior, Rte. 4, Box 156, Wilson, N.C. 27893

Filed May 18, 1976, Ser. No. 687,561
Int. Cl.[2] F28F *13/00*
U.S. Cl. 165—32 6 Claims

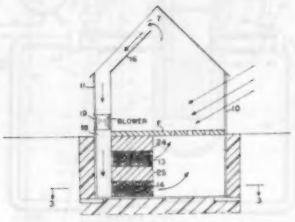


1. Apparatus for transferring heat from a heat source to a remote location comprising a base having an opening therethrough, a hollow body means normally disposed on one side of said base but mounted for movement through the opening of said base, said body means being closed at one end and open at the other end, flexible resilient skirt means connecting said other end of said body means to said base, shield means mounted on said base in spaced relationship with said skirt means and said other end of said body means, a heat expandable fluid medium entirely filling the space between said shield means and said skirt means as well as entirely filling said body means, whereby heat absorbed by said fluid medium causes said medium to expand and move a portion of said body means through the opening in said base so that heat in said body means is dissipated on the other side of said base.

4,051,891
HEAT TRANSFER BLOCK MEANS

Henry Harrison, Locust Valley, N.Y., assignor to Halm Instrument Co., Inc., Glen Head, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,502
Int. Cl.[2] F24D *5/02, 5/10, 11/00;* F24H *7/02*
U.S. Cl. 165—54 2 Claims



1. Heat transfer means comprising a plurality of modular heat transfer blocks adapted to form a passage for heat transfer fluid, exchanging heat with heat storage materials, when heat transfer blocks being in layered contact with said heat storage materials, each of said heat transfer blocks comprising a center core of substantially equally sized stones,

said stones being cemented together with voids in between, and at least one modular heat transmitting panel cemented to the center core.

4,051,892
HEAT DISSIPATION SYSTEM

Arnold Otto Winfried Reinsch, 13170 Carousel Lane, Del Mar, Calif. 92014

Filed Dec. 16, 1974, Ser. No. 533,287
Int. Cl.[2] F28D *15/00;* G21C *9/00*
U.S. Cl. 165—107 5 Claims

1. A heat dissipation system comprising:

a contained source of heat,

a fluid circulation conduit for circulation of fluid to and from said contained source of heat,

coolant fluid in said fluid circulation conduit consisting of a gaseous two-component mixture, one component being a condensable vapor at the conditions prevailing in the system,

a jet circulator means in said fluid circulation conduit having a coolant fluid inlet and a coolant fluid outlet and having a motive fluid inlet,

a vaporizer means in said fluid circulation conduit, containing a coolant fluid flow path with a coolant fluid inlet and outlet and a feed water flow path having a water inlet and a vapor outlet for extracting heat from said coolant fluid and thereby converting a condensed fraction of said coolant fluid in said feed water flow path into vapor,

the coolant fluid outlet of the heat source being connected to the coolant fluid inlet of said vaporizer,

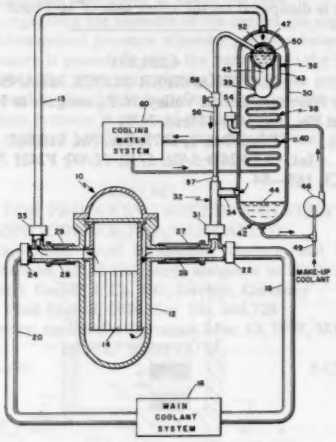
said vapor having a pressure greater than the pressure of said coolant fluid in said fluid circulation conduit,

the vapor outlet of said vaporizer means is connected to said motive fluid inlet of said jet circulator means,

the coolant fluid outlet of said vaporizer is connected to said coolant fluid inlet of said jet circulator means,

said coolant fluid outlet of said jet circulator means is connected to the coolant fluid inlet of the heat source,

heat rejection means in said fluid circulation conduit downstream of said vaporizer means but upstream of the heat source for removing heat from said coolant fluid and



partially condensing said condensible vapors into a condensed fraction of said coolant fluid,

means incorporated in said heat rejection means for separating the condensed fraction from the remaining coolant fluid,

and condensate delivery means for collecting said condensed and separated coolant fluid fraction and delivering it to the inlet of the feed water flow path of said vaporizer means.

4,051,893

AIR CURTAIN-PROJECTING VENTILATOR

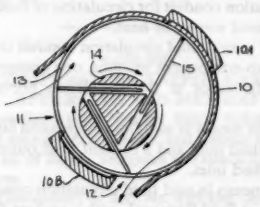
Raul Gulbert, 8343 W. 4th St., Los Angeles, Calif. 90048

Filed Aug. 16, 1976, Ser. No. 714,832

Claims priority, application Argentina, Aug. 18, 1975, 259758; Aug. 18, 1975, 259759

Int. Cl.[2] F28F *13/12*; F24F *9/00*

U.S. Cl. 165—125 **11 Claims**



1. An air curtain-projecting ventilator formed by an elongated air pump comprising:

A. a stator assembly formed by a tubular casing having a relatively broad intake slot an a narrower outlet slot in parallel relation thereto, the slots extending longitudinally the full length of the casing, and an open-coil helix lining the casing, the convolutions of the helix bridging the slots to define grids thereacross which in no way interfere with the flow of air through the slots;

B. a rotor shaft mounted eccentrically within the helix and extending the length thereof, said shaft being driven at high speed; and

C. a set of extensible vanes supported on said shaft, said vanes when extended by centrifugal force being caused to engage the convolutions of said helix and to slide therealong in an uninterrupted circular path whereby the helix functions to encage the vanes within the casing without interfering with the incoming flow of air through said intake slot and its ejection through said outlet slot to produce a high velocity air curtain.

4,051,894

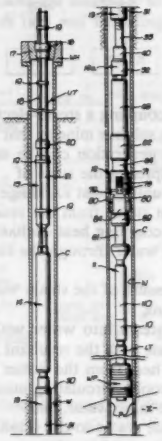
SINGLE STRING HANGER SYSTEM

Bobby F. Goad, Spring, Tex., assignor to Baker International Corporation, Orange, Calif.

Filed July 12, 1976, Ser. No. 704,125

Int. Cl.[2] E21B *7/12*

U.S. Cl. 166—73 **7 Claims**



1. Well production apparatus comprising lower subsurface tubing hanger means adapted to be disposed in a well casing set within a well and to support lower tubing extending downwardly in the well casing from the lower hanger means, upper tubing hanger means disposed at the surface of the well, a well head seat at the surface of the well for said upper tubing hanger means, upper tubular means extending from said lower tubing hanger means to said upper hanger means, said upper tubular means including a spacer connected to said lower hanger means, safety valve means connected to the upper end of said spacer, and means including upper tubing connected to the upper end of said valve and to said upper tubing hanger means, control tubing connected to said safety valve for feeding fluid under pressure to said valve to actuate the same, said control tubing extending upwardly along said upper tubular means, means securing said control tubing to said upper tubular means, said spacer comprising upper and lower members and means interconnecting said members to change the effective length of said upper tubular means in responsive to movement of said upper tubular means, control tubing and upper member relative to said lower member to bring said upper tubing hanger means downwardly into engagement with said well head seat and with said upper tubular means engaged by said lower tubing hanger means.

4,051,895

POSITIONING TOOL

Hugh D. Embree, Lafayette, La., assignor to Production Specialties, Inc., Lafayette, La.

Filed July 14, 1976, Ser. No. 705,144
Int. Cl.[2] E21B *7/06*
U.S. Cl. 166—117.5 **5 Claims**

1. A well valve handling apparatus for use in placing a valve in or removing a valve from a well tubing having a plurality of tubing mandrels each having a main bore therethrough and a side pocket offset from the main bore and including an orientation sleeve mounted in the main bore having a longitudinal orientation slot and a shoulder therein comprising:

a. an elongated cylindrical body member;

b. an elongated plunger telescopically and nonrotatably arranged in said body member;

c. spring means abutting spaced shoulder means on said body member and elongated plunger to tend to urge said elongated plunger and body member into abutting relation adjacent their upper ends;

d. a guide key pivotally mounted on said body member by a shear pin;

e. said body member having a slot therein through which said guide key means projects outwardly from said body member;

f. spring means yieldably urging said guide key means outwardly of said body member for engagement in the longitudinal orientation slot of the desired mandrel while allowing said guide key means to downwardly bypass sleeves above the desired location;

g. shifting tool means pivotally supported by said plunger and adapted to support a valve to be positioned in the side pocket; and

h. cooperating means on said body member and shifting tool means to retain said plunger and shifting tool means axially aligned in the main bore but operable on movement of said plunger relative to said body member for shifting said shifting tool means into the side pocket.

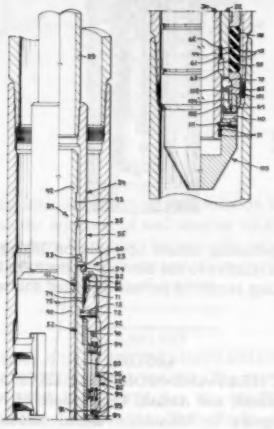
4,051,896

WELL BORE LINER HANGER

Amareswar Amancharla, Dallas, and Carter R. Young, Lewisville, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Division of Ser. No. 533,935, Dec. 18, 1974, Pat. No. 3,946,807. This application Mar. 18, 1976, Ser. No. 668,288
Int. Cl.[2] E21B *23/02, 43/10*
U.S. Cl. 166—123 **4 Claims**

1. A casing hanger for supporting a string of lower casing from a landing nipple secured in a string of upper casing in a well bore, said hanger comprising: a body mandrel having means at an upper end thereof for engagement of a running tool and means at a lower end thereof for connection with an upper end of a string of well casing; an expandable seal on said body mandrel for sealing around said hanger within a landing nipple; locating and locking keys on said body mandrel for locating said hanger at a landing nipple and locking said hanger against downward movement in said landing nipple; said body mandrel being movable relative to said seal and said locating and locking keys, said mandrel having means thereon to permit said locating and locking keys to expand and contract radially at a first upper position of said body mandrel and for locking said keys outwardly at upper and lower ends of said keys at a



lower position of said body mandrel; means including an operation shoulder on said body mandrel for compressing and expanding said seal responsive to downward movement of said body mandrel relative to said seal and said locating and locking keys; means between said locating and locking keys and said body mandrel releasably holding said body mandrel against movement relative to said locating and locking keys at a first upper position of said body mandrel and adapted to permit said body mandrel to move downwardly for expanding said seal and locking said keys outwardly responsive to a force applied to said body mandrel; and means connected with said locating and locking keys for holding said body mandrel at said lower position for maintaining said seal expanded and said keys locked outwardly.

4,051,897

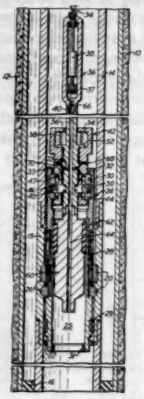
WELL TESTING TOOL

George F. Kingelin, Rosenberg, Tex., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 30, 1975, Ser. No. 645,420
Int. Cl.[2] E21B *23/02*
U.S. Cl. 166—125 **14 Claims**

1. In apparatus for use in a well having a tubing string extending down a borehole, a landing nipple connected in and forming a part of the tubing string and a locking mandrel set in the landing nipple, said locking mandrel having an opening extending longitudinally therethrough and a locking recess in the wall of the opening, a tool adapted to be run into the locking mandrel and retrieved therefrom on a wire line comprising an elongated stem, a stinger below the stem extending downwardly in the longitudinal opening in the locking mandrel, sealing elements around the stinger adapted to engage the wall of the opening through the locking mandrel positioned to prevent flow through the locking mandrel between the locking mandrel and the stem, a sleeve concentric with and longitudinally slidable on the stem, means limiting longitudinal move-

ment of the sleeve relative to the stem, locking dogs constructed and arranged to move radially outward in the sleeve into the locking recess of the locking mandrel to prevent movement of the tool upwardly relative to the mandrel, and



locking dog releasing means operable on lifting the tool to move the stem relative to the sleeve to retract the locking dogs from the locking recess to permit lifting of the tool from the mandrel.

4,051,898

STATIC HEAT-AND-MOISTURE EXCHANGER

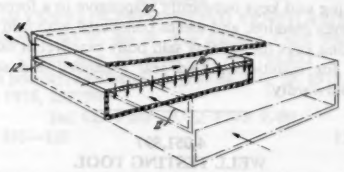
Masataka Yoshino, and Atsushi Oguri, both of Nakatsugawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

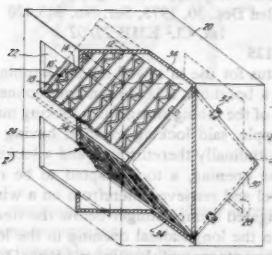
Continuation-in-part of Ser. No. 20,303, March 17, 1970, abandoned. This application Apr. 24, 1972, Ser. No. 246,994

Claims priority, application Japan, Mar. 20, 1969, 44-21477; May 8, 1969, 44-35421; May 12, 1969, 44-43466[U]; Aug. 20, 1969, 44-79026[U]

Int. Cl.[2] F28F *3/12*

U.S. Cl. 165—166 **9 Claims**





1. A static heat-and-moisture exchanger core for transferring both heat and moisture between two fluid streams comprising: an enclosed shell structure having means therein defining a plurality of openings; and heat-and-moisture transfer means statically disposed within said shell structure dividing the interior thereof into two static flow paths each communicating at opposite ends with one of said openings for effecting continuous and simultaneous transfer of both heat and moisture between two fluid streams having different temperatures and humidities flowing through respective ones of said static flow paths during use of the heat-and-moisture exchanger while the same is in a static state, said heat-and-moisture transfer means comprising a member disposed within and dividing the interior of said shell structure into said two static flow paths, said member being composed of a lamination consisting of an aggregate of fibrous material having a thickness of from 0.05 to 1 mm and which is sufficiently thermally conductive and sufficiently permeable to moisture to permit both temperature and humidity exchanges between the two fluid streams to be simultaneously and continuously effected through said member without intermixing of the fluid streams while maintaining the difference in efficiencies between the temperature and humidity exchanges at a value no greater that 40%.

4,051,899

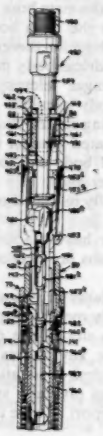
RESET AND PULLING TOOL FOR MANIPULATING WELL SAFETY VALVE

John V. Fredd, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Continuation-in-part of Ser. No. 668,286, March 18, 1976, abandoned, which is a division of Ser. No. 516,205, Oct. 21, 1974, Pat. No. 3,955,624. This application Oct. 5, 1976, Ser. No. 729,702

Int. Cl.[2] E21B *23/00, 31/02*

U.S. Cl. 166—217 **16 Claims**



13. A reset and pulling tool for manipulating a go-devil type well safety valve in a well bore to reopen and latch said safety valve open and pull said safety valve from said bore, said tool comprising: a body having a bore therethrough; a plurality of radially movable flexible locking dogs on said body for coupling into a head end of said safety valve for resetting said valve and for pulling said valve from said bore; a longitudinally movable operator member within said body having side surfaces engageable with side surfaces along said locking dogs for holding said dogs at locking positions when said tool is coupled into said safety valve for resetting and for pulling said safety valve; means for moving said side surfaces on said operator member laterally to engage said locking dogs responsive to longitudinal movement of said operator member; means connected with said operator member for securing said tool in a tool string and for applying longitudinal forces to said tool

from said tool string; means between said operator member and said body for holding said operator member and said body against relative movement during a first mode of operation of said tool for reopening said safety valve; and means for releasing said operator member from said body for movement to a position for operation of said tool in a second mode when releasing said tool from said safety valve for retrieval from a well bore.

4,051,900

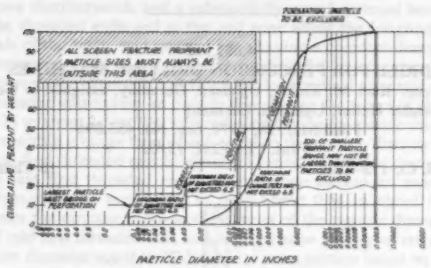
PROPPING MATERIAL FOR HYDRAULIC FRACTURING

Dale Hankins, 243 Irene St., Bakersfield, Calif. 93305

Continuation-in-part of Ser. No. 479,134, June 13, 1974, abandoned. This application May 26, 1976, Ser. No. 690,147

Int. Cl.² E21B *43/04, 43/26*

U.S. Cl. 166—250 **7 Claims**



1. The method of making a screen fracture proppant containing particles capable of retaining high operating permeability when utilized in specific geological and soil formations, which comprises the steps of:

a. making a sieve analysis of the material of the specific formation to determine the diameter size measurement of the smallest particle thereof which is to be prevented from entering the openings of the proppant; and

b. thereafter using as the proppant material a granular particulate having a diameter size measurement corresponding approximately to the diameter size measurement of said smallest particle of the formation multiplied by a factor no greater than 6.5.

4,051,901

PROCESS FOR WATER TREATMENT IN MOBILITY CONTROLLED CAUSTIC FLOODING PROCESS

Amir M. Sarem, Yorba Linda; Russell C. Darr, Oxnard; Dale L. Elchlepp, Santa Maria, and Robert B. Spratt, Westminister, all of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Oct. 12, 1976, Ser. No. 731,777

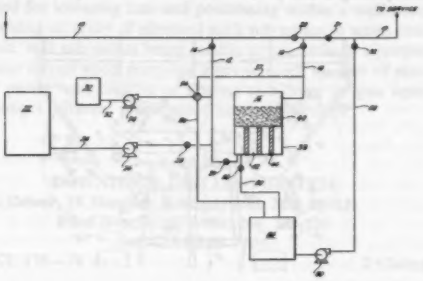
Int. Cl.² E21B *43/22, 33/138*

U.S. Cl. 166—270 **20 Claims**

1. A process for recovering petroleum from a subterranean reservoir penetrated by an injection well and a production well spaced apart in the reservoir which comprises alternately injecting into the reservoir through the injection well for a selected time period a petroleum displacement fluid comprising a dilute alkaline aqueous solution of an alkali metal silicate and thereafter injecting for a selected time period a dilute aqueous precipitate-forming solution of a material that reacts with the alkali metal silicate to form a precipitate, said alkali metal silicate solution further containing alkaline insoluble, scale forming salts comprising cations which form insoluble silicates, the improvement comprising:

a. separating said alkaline insoluble salts from said dilute aqueous alkali metal silicate solution prior to the injection of said solution into the reservoir thereby to reduce the scaling tendency of said alkaline alkali metal silicate solution;

b. contacting said alkaline insoluble salts with a dilute aqueous acid solution to dissolve said salts and to form a precipitate-forming solution comprising said cations which form insoluble silicates; and



c. injecting into said reservoir said solution of step b subsequent to the injection of said alkaline alkali metal silicate solution where by contact between the solutions results in the formation of precipitate and the reduction of reservoir permeability in the area of contact.

4,051,902

SOIL CULTIVATING IMPLEMENTS

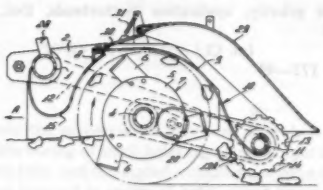
Cornelis van der Lely, 7,Bruschenrain, Zug, Switzerland

Filed Jan. 5, 1976, Ser. No. 646,582

Claims priority, application Netherlands, Jan. 7, 1975, 7500137

Int. Cl.² A01B *33/02, 33/16*

U.S. Cl. 172—32 **25 Claims**



22. A soil cultivating implement comprising a frame and coupling means at the forward side of said frame that is connectable to a prime mover, a plurality of soil engaging members mounted side by side in a row that extends transverse to the direction of travel, said members being bars that extend downwardly to the rear into the soil with respect to the normal direction of travel, said bars being interconnected to one another adjacent their lower ends and positioned to guide stones and other debris downwardly into subsoil, the lower ends of said bars being interconnected by a shaft that extends transverse to the direction of travel and a plurality of discs being mouned on said shaft.

4,051,903

SOIL CULTIVATING MACHINES

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Oct. 9, 1975, Ser. No. 620,919

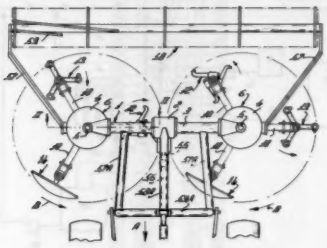
Claims priority, application Netherlands, Oct. 10, 1974, 7413312

Int. Cl.² A01B *33/06, 33/10, 33/12, 33/14*

U.S. Cl. 172—47 **20 Claims**

16. A soil cultivating machine comprising a frame and at

least one soil working member mounted on said frame, said soil working member being rotatable about an upwardly extending axis and driving means connected to rotate said soil working member about said axis, at least one soil cultivating means being mounted for free rotation on said soil working member, said cultivating means being releasably secured in mounting means on said working member and said mounting means comprising a first pivotal axis and a second pivotal axis, said



cultivating means being adjustable about both pivotal axes and fixable in any one of a plurality of different working positions relative to either picotal axis, said cultivating means being journalled to said mounting means with a stub shaft and the longitudinal center line of at least part of said stub shaft on which said cultivating means is mounted, constituting said second pivotal axis, said cultivating means and said stub being turnable about said longitudinal center line and fixable in different angular positions, about said center line.

4,051,904

SOIL CULTIVATING IMPLEMENTS

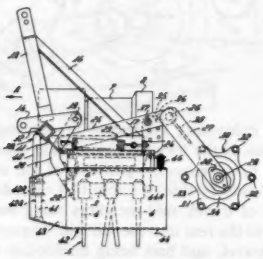
Ary van der Lely, Maasland, and Cornelis Johannes Gerardus Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N. V., Maasland, Netherlands

Filed Dec. 18, 1975, Ser. No. 642,052

Claims priority, application Netherlands, Dec. 23, 1974, 7416758

Int. Cl.[2] A01B *33/06, 49/02*

U.S. Cl. 172—49 **7 Claims**



7. A soil cultivating implement comprising a frame and a plurality of rotatable tined soil working members arranged in a row supported on a portion of said frame, said portion extending transverse to the normal direction of travel, a screen being mounted at each lateral end of said portion and positioned to cooperate with the tine means of the respective outermost soil working member of said row during rotation of that member, said screen being pivotable about an upwardly extending axis located near the front of said frame portion with respect to the normal direction of travel and said screen comprising a guide portion at its front end that is inclined to said direction of travel and positioned to deflect plants outwardly from the soil working members, a roller being positioned behind the soil working members and said roller being pivotably connected to said frame portion by spaced apart arm means, said arm means including arms that are connected to the frame portion at locations intemediate opposite ends of those arms, connection means retaining said arms in chosen angular positions about pivotable connections thereof to said frame portion, said arms being spaced apart and interconnected by a transverse support that is located adjacent the rear of said frame portion, said transverse support being elongated and further arms being coupled to the transverse support and said further arms being inclined downwardly and rearwardly with respect to the direction of travel, the rear portions of said further arms coupled to said roller and retaining same in a supporting position for the implement, the outer circumference of said roller being formed by a plurality of elongate elements that extend in general alignment with the axis of rotation of the roller, said elongate elements being mounted on spaced apart supports that have recessed positioned between adjacent screening discs being positioned adjacent said further arms at the lateral ends of said rotatable supporting member.

4,051,905

DRILL FOR PERCUSSION DRILLING MACHINES

Werner Kurt M. Kleine, Uphusen, Germany, assignor to Gerbruder Heller, Uphusen, Germany

Filed Mar. 28, 1974, Ser. No. 455,896

Int. Cl.[2] E21C *15/02*

U.S. Cl. 173—104 **13 Claims**

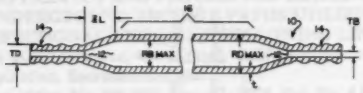
1. A drill for use in a drilling machine for working on rocks and concrete and especially for use with percussion drilling machines and rotary drill hammers, comprising an axially elongated drill shank formed of a hardened material and having a first end arranged to contact within the adapter of the drilling machine, said adapter being provided with an inner thread, said second end having an axially extending outer surface, wherein the improvement comprises that a unitary receiving part is disposed in mechanical interlocking surface contact connection with and extends at least partly about and laterally encloses the axially extending outer surface of the second end of said drill shank and is formed entirely of a plastic material which has a lower hardness than that of the material forming said shank, said receiving part having an axially extending radial inner surface in full surface contact with the axially extending outer surface of said second end of said drilling shank, said surfaces being formed for mechanical interlocking connection, said receiving part having further and axially extending radial outer surface provided with a thread for engagement with said inner thread of the adapter of the drilling machine so that because of its lower hardness said receiving part is deformable under the action of the torque transmitted to it by the adapter, said receiving part having a leading end closer to the first end of said shank and a trailing end spaced axially from the leading end, and the second end of said drill shank extending through said receiving part at least to the trailing end of said receiving part so that axial blows are transmitted directly to the second end of said drill shank.

4,051,906

EXTENSION RODS USED IN PERCUSSIVE DRILLING

Edward Alfred Donegan, St. Catharines, Canada, assignor to TRW Canada Limited, Canada

Filed Mar. 3, 1976, Ser. No. 663,266
Int. Cl.[2] B25D 9/00
U.S. Cl. 173—131 7 Claims



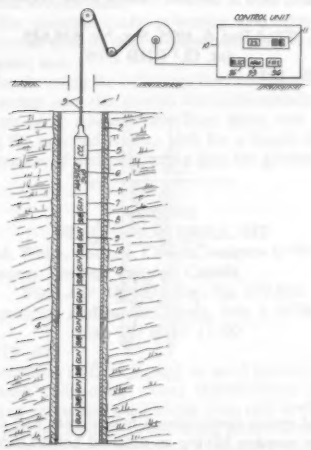
1. A substantially round, percussive drill extension rod adapted to withstand high velocity strain pulses superimposed on rotary forces in percussive drilling comprising an elongated body having first and second externally threaded ends, a rod zone therebetween, and a substantially round, internal bore in the threaded ends and in the rod zone along the longitudinal axis of the body, said internal bore having a constant diameter throughout said rod zone and providing fluid communication through the extension rod along the longitudinal axis, said first threaded end having an outside diameter in the range of about 1.25 to about 2.5 inches, said rod zone having an outside diameter within a range from about equal to the outside diameter of said first threaded end to about 1.1 times the outside diameter of said first threaded end, said rod zone having an annular cross-sectional area equal to from about 0.64 to about 0.76 times the circular cross-sectional area of the outside diameter of said first threaded end, and said rod zone having an internal bore diameter equal to 2(√(circular cross section based on the outside diameter of of the rod zone minus the annular cross section of the rod zone) divided by π).

4,051,907

SELECTIVE FIRING SYSTEM

James D. Estes, Houston, Tex., assignor to N L Industries, Inc., New York, N.Y.

Filed Mar. 10, 1976, Ser. No. 665,807
Int. Cl.[2] E21B 43/116, 43/117
U.S. Cl. 175—4.55 4 Claims



1. A perforating gun firing system comprising, in combination, an array of guns vertically spaced in an elongated mechanical unit adapted for lowering into and positioning within a well bore, each of said guns being actuated by a slave sub associated therewith, and said unit having a master sub having its gun operatively connected therewith; an above-ground control means for producing and transmitting to said master sub a series of electrical pulses, the number of which is indicative of the pre-selected slave sub to be armed and fired, said master sub including means responsive to said series of pulses and said slave subs including means selectively responsive to said series of pulses, whereby any of the guns in said array may be armed and fired in a selected order.

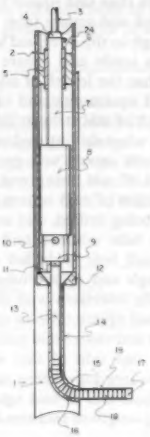
3. A slave sub means adapted for use in a perforating gun adapted for lowering into and positioning within a well bore, comprising an array of identical such sub means in series connection, said sub means being readily convertible to a jumper or shunt circuit upon receiving a pre-selected number of electrical pulses, and capable of arming and firing its gun upon receiving a different pre-selected number of pulses.

4,051,908

DOWNHOLE DRILLING SYSTEM

W. B. Driver, 19 Sheridan Road, Arnold, Md. 21012

Filed Nov. 5, 1976, Ser. No. 739,106
Int. Cl.[2] E21B 7/04
U.S. Cl. 175—78 2 Claims



1. Wherein the invention an improved downhole drilling system for the boring of small holes from and at right angles to a larger well hole, and the system comprises, a large diameter tubing string lowered in said well hole, a tube fitting, a small diameter tube section, said fitting attaches the uphole end of said section to the downhole end of said string, a ninety degree elbow, one end of said elbow being attached to the downhole end of said section, one end of said elbow interfaces with the wall of said well hole where a small hole is to be drilled, an electrical mechanical cable, a downhole electrical motor, said cable suspends and provides power to said motor in said string, said cable hoist said motor in and out of said string, a square pipe, a cable connector, said connector connects the uphole end of said square pipe to an end portion of said cable, said cable extends through said connector through said square pipe and connects to the uphole end of said motor, downhole end of said square pipe connects to the uphole end of said motor, a pump being of the advancing cavity type, rotor of said pump being helical shaped, output shaft of said motor connects to the uphole end of said rotor, a hollow rod, one end of said rod being open, one end of said rod being closed, closed end of said rod attached to the downhole end of said rotor, an output port through the wall of said rod near the closed end of said rod, housing of said pump connects to the downhole end of said motor and extends over and enclosed said output port, and input port through said housing above the uphole end of said rotor, a wire wound flexible drill pipe, a drill bit attached to the downhole end of said flexible drill pipe, a drill pipe stem,

uphole end of said drill pipe stem attached to the open end of said rod, downhole end of said stem attached to the uphole end of said flexible drill pipe, inside diameter of the downhole end of said fitting equal to the inside diameter of said section, inside diameter of the uphole end of said fitting equal to the inside diameter of said string, inside wall of said fitting diverges for the downhole end of said fitting to the uphole end of said fitting forming a funnel shaped passage so said bit, flexible drill pipe and stem can feed into said section without hanging up, inside diameter of said section being large enough to let said bit pass through and said flexible drill pipe and said stem operate inside said section but hole said flexible drill pipe straight, length of said being longer than the length of said flexible drill pipe, length of said stem being longer than both the length of said fitting and length of said section, an exhaust hole through the wall of said elbow near end of said elbow that interfaces with wall of said well hole, said pump pumps air, water or other fluids from inside of said string or well hole through said rod, said stem, said flexible drill pipe and said bit to flush cuttings from said small hole through said exhaust hole into said well hole, a square tube, a packer being of the type activated by rotation and released by an uphole pulling force and being shorter in length than said square tube, said packer constructed to and around said square tube, inside of said square tube being large enough to slip over said square pipe but not let said square pipe turn inside said square tube, length of said square pipe greater than the length of said square tube, difference in length of said square pipe and said square tube being greater than the length of said stem so the maximum length of said stem can be used when drilling said small hole, back swing when said motor starts causes said packer to activate and anchor to inside wall of said string and through said square tube eliminating rotation of said square pipe and said motor while a small hole is being drilled, said square pipe slips down through said square tube while a said small hole is being drilled, after said small hole is drilled said cable pulls said square pipe up through said square tube until the downhole end of said square tube interfaces with the uphole end of said motor and through said square tube an uphole pulling force is applied to said packer and causes said packer to release, a metal arm extending from one side of said square pipe near the uphole end of said square pipe keeps said square tube from slipping over the uphole end of said square pipe while being lowered in said string, length of said arm extends to the outside of square tube.

4,051,909

TURBINE DRILL FOR DRILLING AT GREAT DEPTHS

Werner Baum, Canoga Park, Calif., assignor to P.E.I. Incorporated, Canoga Park, Calif.

Filed Nov. 22, 1976, Ser. No. 743,914
Int. Cl.[2] E21B *3/08*
U.S. Cl. 175—93 **18 Claims**

1. A drilling device having special utility for drilling at great depths in the earth's surface, said drilling device comprising:

a tubular drilling lance having a top end and a bottom end, said drilling lance adapted to being lowered to great depths in the surface of the earth and being raised therefrom;

an energy generating system disposed in said lance, said energy generating system being characterized by:

a. a fluid vaporizing system, said fluid vaporizing system comprising:

i. at least one fuel container and fuel contained therein, said fuel container is a collapsable bellow-like container configured such that external pressure on said container provides a positive pressure on said fuel contained therein,

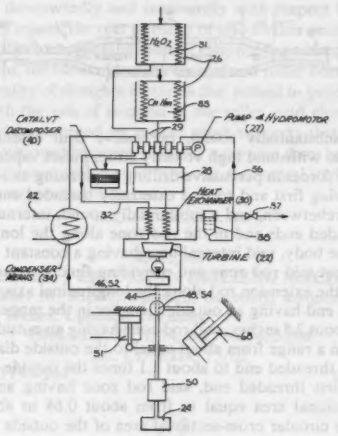
ii. a reaction chamber coupled to said fuel container,

iii. a heat exchanger coupled to said reaction chamber such that heat from said chamber is transferred to said heat exchanger,

iv. vaporizable fluid communicating with said heat exchanger whereby said fluid is caused to vaporize by said heat, and

v. condenser means directly coupled to said heat exchanger such that said fluid is selectively cooled and returned to said heat exchanger without loss of said fluid; and

b. a turbine coupled to said vaporizing system by a closed



fluid circuit such that said fluid is coupled from said heat exchanger to said turbine and further coupled from said turbine to said condenser means; and

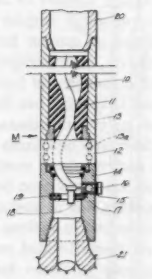
drilling means disposed adjacent to and extending outwardly from said bottom end of said drilling lance, said drilling means coupled to said turbine such that activation of said turbine by said fluid vaporizing system causes activation of said drilling means.

4,051,910

TWO WAY EARTH BORING FLUID MOTOR

Wallace Clark, 1830 S. German Church Road, Indianapolis, Ind. 46239

Filed Dec. 8, 1975, Ser. No. 638,639
Int. Cl.[2] E21B *1/06*
U.S. Cl. 175—103 **9 Claims**



1. A fluid motor comprising a helical gear pair constituted by an inner member having an external helical thread, and a cooperating outer member having one more internal helical thread than the number of external helical threads on said inner member, a tubular casing, the outer member of said gear pair being fixed in said casing, a water swivel having an axial intake, said casing being secured to one of the relatively rotatable sections of said water swivel, and means associated with an end of said inner member and with the other relatively rotatable

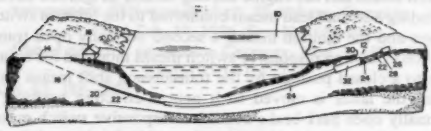
section of said water swivel to prevent rotation while permitting gyration of said inner member relative to said outer member, and a tapered thread at the end of said tubular casing, and a tapered thread at the end of said other relatively rotatable section of said water swivel.

4,051,911

APPARATUS AND PROCESS FOR DRILLING UNDERGROUND ARCUATE PATHS UTILIZING DIRECTIONAL DRILL AND FOLLOWING LINER

Martin D. Cherrington, Carmichael, Calif., assignor to Tidril Corporation, Sacramento, Calif.

Division of Ser. No. 506,920, Sept. 17, 1974, Pat. No. 4,003,440.
This application June 11, 1976, Ser. No. 695,240
Int. Cl.² E21B *3/12, 7/04*
U.S. Cl. 175—107 **3 Claims**



1. Apparatus for drilling along an inverted underground arcuate path beneath an obstacle from a first position at or near ground level on one side of the obstacle to a second position at or near ground level on the other side thereof, said apparatus comprising:

a motor-powered directional drill adapted to be advanced into the ground along the arcuate path;

a trailing drill string connected to the trailing end of the directional drill;

a following liner disposed circumferentially about said drill string and having a length less than the length of the drill string so that the penetration of the following liner into the ground is less than the penetration of the drill string into the ground,

means for crowding and directing the directional drill and the trailing drill string into the ground from said first position on said one side of the obstacle and along said inverted arcuate path;

means for simultaneously powering said motor-powered directional drill to drill a pilot hole directionally along said path; and,

means for thrusting the following liner independently of said drill string into the ground circumferentially about the drill string to advance said liner about said drill string along the inverted arcuate path for a length less than the penetration of said pilot string into the ground.

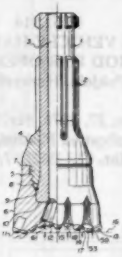
4,051,912

PERCUSSION DRILL BIT

Kenneth M. White, Calgary, Canada, assignor to Western Rock Bit Company Limited, Calgary, Canada

Filed Apr. 23, 1976, Ser. No. 679,662
Claims priority, application Canada, Feb. 3, 1976, 244910
Int. Cl.² E21C *13/00*
U.S. Cl. 175—410 **7 Claims**

1. A percussion drill bit having an anvil portion and a head portion, with connecting means therebetween to transmit torsional and percussive axial forces from said anvil portion to said head portion, a plurality of cutting inserts arranged on the cutting end of said head portion in a pluraliity of circumferentially-spaced groups, said cutting end having fluid flow passages thereacross separating said groups of inserts, at least some of said inserts being so arranged that during drilling operations said some of said inserts penetrate the formation being drilled by generally equal amounts and are thus subject to generally the same loading, corresponding sets of inserts, one set from each group, being at the same radial distance from the drill axis, and successive inserts in one set, in the direction of rotation of the drill, being at progressively lesser axial distances from a reference plane transverse to the axis at the lowermost end of the head portion, and at the same axial distance from said reference plane as corresponding inserts in the other sets, the spacing between inserts in each set being substantially uniform, and the outermost of any radially adjacent pair of sets having a greater number of inserts than the innermost of said pair.

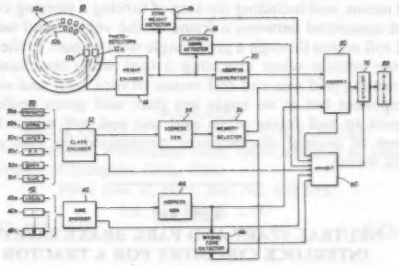


4,051,913

ELECTRONIC POSTAGE SCALE

Dumitru Gudea, Chicago, Ill., assignor to Triner Scale and Manufacturing Company, Chicago, Ill.

Filed Jan. 27, 1976, Ser. No. 652,820
Int. Cl.² G01G *19/413*
U.S. Cl. 177—25 **19 Claims**



1. A postage scale or the like for displaying the postal rate for a parcel to be shipped to a destination, comprising first selectively operable means for selecting the class of shipment of said parcel; second selectively operable means for selecting the relative destination zone of said parcel; weight data generating means for generating digital data corresponding to the weight of a parcel placed on said scale; memory means having a plurality of sections, each section corresponding substantially to at least one of said classes of shipment and storing, at addressable locations therein, postal rate data for each weight increment of a parcel to be shipped to each of said destination zones by said corresponding class of shipment; addressing means responsive to the selective operation of said first and second selectively operable means and to said parcel weight data for addressing a memory storage location associated with a parcel of determined weight to be shipped to a selected destination zone by a selected class of shipment; memory read-out means for reading out stored postal rate data from said addressed memory storage location; display means coupled to said memory read-out means for displaying an alphanumeric representation of said stored postal rate data; detecting means for detecting a plurality of conditions including the absence of a parcel from said scale, the removal of a parcel from said scale, the improper selection of a destination zone, the incom-

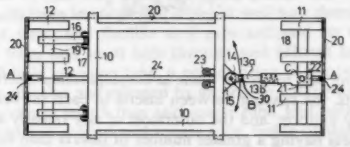
plete selection of a class of shipment and the addressing of an improper memory storage location; and inhibit means responsive to at least one of said conditions detected by said detecting means for inhibiting the display of an alphanumeric representation.

4,051,914

ENDLESS TRACK VEHICLE HAVING A STEERABLE END AND METHOD FOR OPERATING THE SAME

Jorma Toivo Tapani Pohjola, Haravatie 6, 90530 Oulu 53, Finland

Filed Jan. 27, 1976, Ser. No. 652,823
Claims priority, application Finland, Jan. 30, 1975, 750243
Int. Cl.[2] B62D *11/22*
U.S. Cl. 180—9.44 **18 Claims**



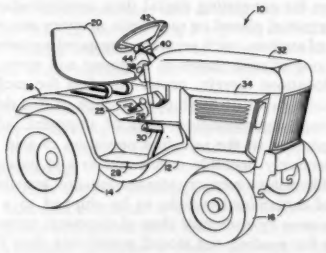
1. In a method of operating a vehicle which has front and rear end roll means and an endless track means guided around said front and rear end roll means and capable of becoming shorter on one side and longer on an opposite side when the vehicle executes a turn, the step of angularly displacing at least one of said end roll means about an upright axis in a substantially horizontal plane while executing a turn with the vehicle, and simultaneously with the angular displacement of said one end roll means freeing the latter to assume an angular position determined by the endless track means which engages one end roll means, and including the step of turning a steering component connected between a frame of the vehicle and said one end roll means through a given angle with respect to the frame of the vehicle when executing a turn while simultaneously permitting said one end roll means to turn with said steering component but at an angle less than said given angle with respect to said frame while said one end roll means has its extent of angular displacement determined by said endless track means.

4,051,915

NEUTRAL START AND PARK BRAKE SAFETY INTERLOCK CIRCUITRY FOR A TRACTOR

Robert Nick Behrens, Horicon, Wis., assignor to Deere & Company, Moline, Ill.

Filed Nov. 5, 1976, Ser. No. 739,077
Int. Cl.[2] B60K *28/00*
U.S. Cl. 180—82 A **1 Claim**



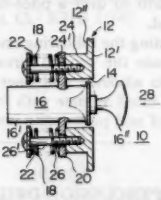
1. In combination with a lawn and garden tractor including an electrically responsive engine starting means and an ignition means, a transmission shift means movable between neutral-effecting and drive-effecting positions, park brake control means movable between park brake release and park brake engage positions, and a power take-off clutch control means movable between clutch-engage and clutch-disengage positions, a safety interlock circuit, comprising: a source of electric energy; an ignition switch means connected to the source; a starting circuit including a first lead means connected between the ignition switch means and the engine starting means; a normally open power take-off clutch condition responsive switch means mounted for actuation to a closed position by the clutch control means only when the latter is moved to its clutch-disengage position; a first normally open transmission condition responsive switch means mounted for actuation to a closed position by the transmission shift means only when the latter is moved to its neutral-effecting position; said clutch condition responsive switch means and first transmission condition responsive switch means being connected between the ignition switch means and the engine starting means in the first lead means in series with each other and with the ignition switch means and the engine starting means; an ignition circuit including a second lead means connected to the ignition switch means and the ignition means; a second normally open transmission condition responsive switch means mounted for actuation to a closed position by the transmission shift means only when the latter is moved to it neutral-effecting position; a normally open park-brake condition responsive switch means mounted for actuation to a closed position by the park brake control means only when the latter is moved to its park brake disengage position; and said second transmission condition responsive switch means and said park brake condition responsive switch means being connected in said second lead means between the ignition switch means and the ignition means in parallel to each other, whereby the tractor cannot be started with the transmission or power take-off clutch engaged or driven with the park brake engaged.

4,051,916

APPARATUS FOR MOUNTING INSTRUMENT TO INSTRUMENT PANEL IN MOTOR VEHICLE

Takaaki Oda, Musashimurayama, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Dec. 22, 1975, Ser. No. 643,610
Int. Cl.[2] B60K *20/08*
U.S. Cl. 180—90 **1 Claim**



1. In a motor vehicle having a passenger compartment:
an instrument panel having a first surface, on one side thereof, exposed to the passenger compartment and a second surface, on the other side thereof, the instrument panel having an opening formed therethrough;
an instrument mounted to said instrument panel having a body disposed in an area on the said other side of said instrument panel and a knob projecting from the body into the passenger compartment through the opening formed throught the instrument panel;
means for holding the instrument in an operative position in which the knob projects into the passenger compartment by a predetermined amount from the first surface, but permitting the instrument to move in a sense tending to retract the knob from the passenger compartment upon application of a force exceeding a predetermined value on

the instrument in a sense tending to move the instrument toward the opening of the instrument panel;

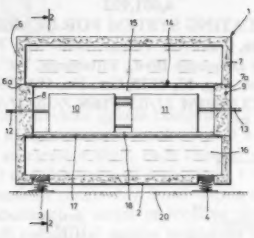
the instrument holding means including at least one projection on the second surface of the instrument panel adjacent the opening of the same; a plurality of bolts screwed into the projection, the bolts having shank portions, respectively, which extend in parallel with each other; a flange secured to the instrument, the flange being slidably mounted on the shank portions; and springs mounted around the shank portions, respectively, the springs being compressed to bias the flange into abutting engagement with the projection.

4,051,917

SOUND-DAMPING HOUSING

Edgard Grundmann, Fallersleben, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Feb. 18, 1976, Ser. No. 658,900
Claims priority, application Germany, Mar. 1, 1975, 2509065
Int. Cl.[2] F01N *7/16*
U.S. Cl. 181—200 **10 Claims**



1. For use with a piece of sound-generating equipment, a sound-damping housing having inner and outer housing means surrounding each other, said inner housing means having a lower wall and said outer housing means having a support wall, said walls being arranged at different heights, said inner housing means forming a first chamber for receiving the piece of sound-generating equipment, said inner and outer housing means forming between themselves a second chamber for receiving and remaining filled with a sound-damping liquid during the operation of the piece of sound-generating equipment, said second chamber in sectional elevation completely surrounding said first chamber; and means communicating with said first chamber for allowing the insertion and withdrawal of the piece of sound-generating equipment into and out of said first chamber, in consequence of which said sound-damping housing and the piece of sound-generating equipment may be transported separately from each other.

4,051,918

SEISMIC ENERGY SOURCE

Joe M. Rogers, Houston, Tex., assignor to Applied Research & Development Company, Houston, Tex.

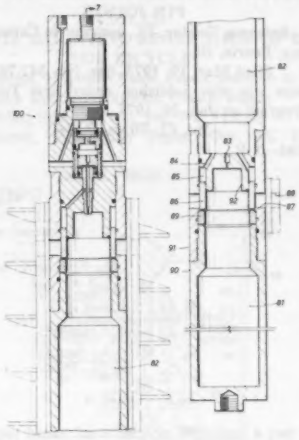
Filed May 16, 1975, Ser. No. 578,255
Int. Cl.[2] G01V *1/04*
U.S. Cl. 181—119 **7 Claims**

1. An apparatus for creating a seismic shock wave to be propogated through the earth in seismic investigations comprising:

an auger means having:

a helical flite thereon which is adapted to enter the earth on rotation;

an elongate body having means for receiving at least two pneumatically operable sonic shock wave creating means, said sonic means cooperative with said auger means and having an opening from said body to the



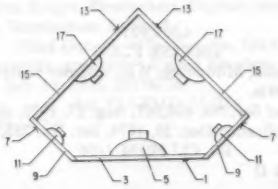
exterior of said body for directing sonic energy into the earth below the earth's surface.

4,051,919

HIGH FIDELITY SPEAKER ENCLOSURE

John M. Buettner, Willoughby Hills, Ohio, assignor to John M. Buettner, Willoughby Hills, Ohio

Filed Dec. 8, 1975, Ser. No. 638,555
Int. Cl.[2] H05K *5/00*
U.S. Cl. 181—144 **3 Claims**



1. A vertically disposed high fidelity speaker array mounted in an enclosure, which array comprises:

a. a full range speaker board,

b. a pair of tweeter boards disposed at an angle from 120° to 165° with respect to said full range speaker board, and

c. a pair of midrange speaker boards disposed at an angle between 5° and 85° with respect to said full range speaker board,

d. said tweeter boards being disposed between and abutting said full range and midrange boards,

e. each board bearing at least one speaker thereon, and

f. all speakers being directed away from the area defined by said boards.

4,051,920
METHOD AND APPARATUS FOR VACUUM EVACUATION AND PRESSURE FILLINGS OF SEALED PIN JOINTS

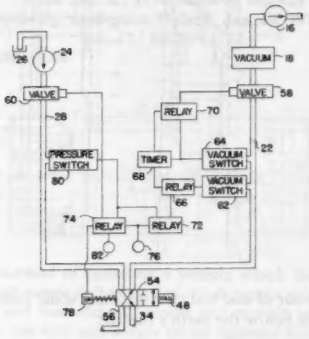
Harold L. Reinsma, Dunlap, Ill., assignor to Caterpillar Tractor Company, Peoria, Ill.

Filed Mar. 19, 1973, Ser. No. 342,763

Disclosure was also published under first Trial Voluntary Protest Program on Jan. 28, 1975

Int. Cl. F01m *11/04*

U.S. Cl. 184—1 R **3 Claims**



1. An apparatus for filling a lubricant reservoir comprising:

gun means adapted for sealing engagement with an opening of the lubricant reservoir,

a source of vacuum,

a source of lubricant, and

sequence timing and shutoff means for first intercommunicating said vacuum source with said lubricant reservoir by way of said gun to evacuate said lubricant reservoir and then intercommunicating said lubricant source with said lubricant reservoir to fill said lubricant reservoir with lubricant,

wherein the sequence timing and shutoff means comprise timing means actuatable upon evacuation of the lubricant reservoir to a certain level, and indicator means operatively coupled with said timing means for indicating that evacuation of the reservoir has been held at a level relative to said certain level for a given time.

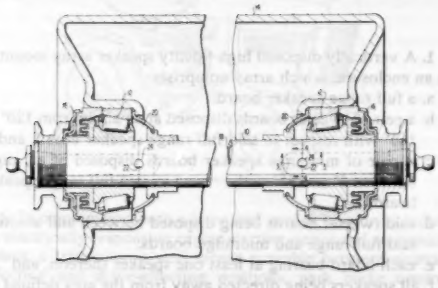
4,051,921
GREASE PLUG

Jerome F. Sheldon, Milwaukee, Wis., assignor to Rexnord Inc., Milwaukee, Wis.

Continuation of Ser. No. 608,367, Aug. 27, 1975, abandoned. This application Dec. 28, 1976, Ser. No. 755,104

Int. Cl.² F01M *1/06*

U.S. Cl. 184—1 D **26 Claims**



1. The combination of a member having a through-greasing passage and a cross hole extending from the through-greasing passage to the surface of the member and a grease plug releasably mounted in the cross hole so as to reduce the effective cross-sectional area of the cross hole, said grease plug comprising:

a. a generally cylindrical plug portion having

i. a radius of size sufficient to cause said plug portion to fit snugly into the cross hole and

ii. at least one grease passage extending generally axially of said plug portion along the outer periphery thereof so that said plug portion reduces the effective cross-sectional area of the cross hole while still forming a grease opening, the effective cross-sectional area of the grease passage or passages being equal to the desired cross-sectional area of the cross hole, and

b. a generally hook-shaped mounting portion

i. integral with said plug portion on one axial face thereof;

ii. made of a resilient material, and

iii. dimensioned so that the mounting portion can be readily pressed through the cross hole, but is prevented from working out of the cross hole by the spacing between the legs of the hook-shaped mounting portion.

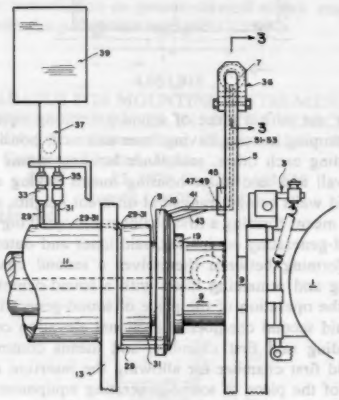
4,051,922
LUBRICATING SYSTEM FOR BEARINGS

Vincent F. Sukle, Oakwood Village, Ohio (c/o Wean United, Inc., 948 Fort Duquesne Blvd., Pittsburgh, Pa. 15222)

Filed Aug. 13, 1975, Ser. No. 604,279

Int. Cl.² F01M *11/02*; F16N *7/36, 21/00*

U.S. Cl. 184—7 R **6 Claims**



1. An improved lubricating system for a wire buncher or similar machine for supplying lubricant to a flyer sheave bearing thereof, said buncher having a rotating shaft to which a flyer disc is secured and to which a flyer sheave is outwardly radially mounted, comprising:

a stationary tube means,

means for collecting lubricant, said means incuding a lubricant collecting ring rotatable with said shaft,

said stationary tube means being so constructed and arranged that its one end receives lubricant from a stationary supply and its other end terminates in a manner to discharge lubricant into said ring and,

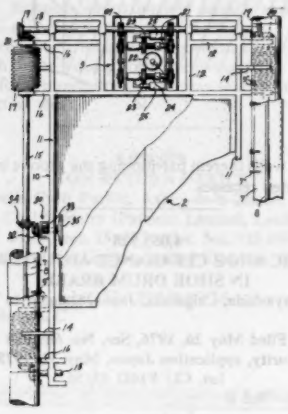
a rotatable passage means providing lubricant communication with said ring for receiving said lubricant discharged therein, at least a portion of said rotatable passage means extending radially outward relative to of said flyer disc and terminating adjacent said flyer sheave, the arrangement being such that lubricant collected by said ring is forced by centrifugal force through said rotatable passage means to said flyer sheave bearing.

4,051,923

CABLELESS CAGE ELEVATOR

Lionel Blanchette, and Adrien André Blanchette, both of 550 Decarie Boulevard, Apt. 6, Saint Laurent, Canada (H4L 3K9)

Filed Oct. 20, 1976, Ser. No. 734,256
Int. Cl.[2] B66B 9/02
U.S. Cl. 187—25 2 Claims



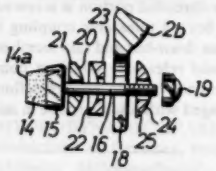
1. A cableless elevator system comprising a pair of laterally spaced-apart upright channels, each adapted to be secured to a side wall of an elevator shaft, each channel of U-shape construction and opening towards each other, a series of hollow cylindrical sections removably fitted within each channel in end-to-end abutment, a series of locating pins locating and centering each cylindrical section within the respective channels, lugs protruding from each side of each channel, ears protruding from said cylindrical sections and engaged by said lugs, said lugs and ears having aligned holes and locking pins removably inserted into said aligned holes of said lugs and ears, each cylindrical section having a longitudinally extending slot having a width not more than one-third of the periphery of the cylindrical section, the slots of the cylindrical sections being in alignment and forming a continuous slot facing towards the slot of the cylindrical sections of the other channel when the cylindrical sections are removably secured in proper position in each channel, each cylindrical section having an internal square thread forming a continuity with the square thread of adjacent cylindrical sections, the sides of each channel forming an externally protruding and longitudinally extending guide ridge, a rectangular and planar vertically extending frame disposed between each assembly of channels and cylindrical sections, an elevator cage fixed within said frame, two driver units mounted on said frame: one on top and one at the bottom of said elevator cage and each including a transversely extending drive shaft entering at both ends into the respective cylindrical cylinder sections through the respective slots, bevel gears secured to the ends of the respective transverse drive shaft, within said cylinder sections, frame extensions carried by said frame and extending through the respective slots above and below said cage, a vertical shaft rotatably carried by said frame extensions and located upright within the respective assemblies of cylinder sections, a pair of worms spacedly secured on each vertical shaft and in threaded engagement with the threads of the cylinder sections at the top and bottom of the frame, a bevel gear secured to the top and bottom of each vertical shaft and in respective meshing engagement with the bevel gears of each transverse shaft, each drive unit further including a separate power means for driving the respective transverse shaft and clutching and reversing mechanism for clutching and declutching the respective transverse shafts and for reversing the direction of rotation of the same, and U-shape shackles carried by said frame and respectively engagable with said guiding ridges of said channels at the top and bottom of said frame.

4,051,924

DEVICE FOR MOUNTING BRAKE SHOE OF BRAKE FOR BICYCLE

Kiyokazu Yoshigai, Higashi-Osaka, Japan, assignor to Yoshigai Kikai Kinzoku Kabushiki Kaisha, Osaka, Japan

Filed Sept. 2, 1976, Ser. No. 719,739
Claims priority, application Japan, Oct. 15, 1975, 50-141571[U]
Int. Cl.[2] B62L 1/12
U.S. Cl. 188—24 2 Claims



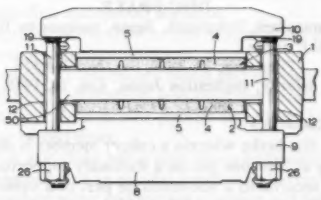
1. In a caliper brake for a bicycle including a pair of brake shoes disposed on the opposite sides of the rim of a wheel and engageable with a disengageable from the rim, a pair of brake arches each having a support bore for receiving a shoe stem of each of the brake shoes extending therethrough and nuts each screwed on the projecting end of each of the shoe stems extending through the support bore, a device for mounting the brake shoe comprising universal spherical surface assemblies coupling the brake shoe to the brake arch, each of the assemblies comprises a first washer having a convex portion and a second washer having a concave seat and a third washer provided between the nut and the brake arch, the third washer having a convex portion for seating the nut thereon, the convex portion of the first washer and the concave seat of the second washer being cooperative to freely adjust the position of the brake shoe when the nut is loosened and the brake shoe stem is inclined within the support bore thereof, so that the nut is tightly fastened with a brake block on the brake shoe properly opposed to the rim.

4,051,925

DISC BRAKES FOR VEHICLES INCLUDING A SCREW-THREADED DRAW BAR ASSEMBLY

Peter Charles Knight, Birmingham, England, assignor to Girling Limited, Birmingham, England

Filed Oct. 21, 1976, Ser. No. 734,670
Claims priority, application United Kingdom, Nov. 11, 1975, 46500/75; July 10, 1976, 28776/76
Int. Cl.[2] F16D 55/224
U.S. Cl. 188—72.4 14 Claims



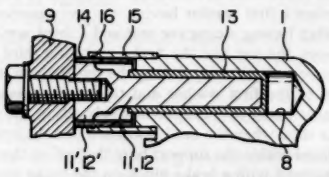
1. A disc brake comprising first and second friction pad assemblies for engagement with opposite faces of a rotatable disc, a relatively stationary carrier member, actuating means for urging said first friction pad assembly directly into engagement with a first face of said disc, a clamping member straddling a portion of the periphery of said disc, said clamping

member comprising first and second pressure plates which are chordal to said disc and are located on opposite sides thereof with said first pressure plate located adjacent to said first friction pad assembly, said second pressure plate acting on said second friction pad assembly, and circumferentially spaced draw-bars which interconnect said pressure plates at the outermost ends there of and determine the axial spacing between said pressure plates, the reaction of said actuating means acting indirectly on said second friction pad assembly through said second pressure plate such that said second friction pad assembly is applied to a second face of said disc opposite said first face, a first end of at least one of said draw-bars having a screw-threaded portion an end portion and a groove between said portions, a member having a screw-threaded bore into which said screw-threaded portion is screwed, means defining a groove in said bore, a releasable coupling between said one end of the said one draw-bar and said member having a screw-threaded bore, said releasable coupling comprising an abutment member retained by said groove-defining means in said member and engaged within said groove in said first end of said draw-bar.

4,051,926
DISC BRAKE

Yasuo Karasudani, Yokohama, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Aug. 13, 1976, Ser. No. 714,324
Claims priority, application Japan, Aug. 19, 1975, 50-114178[U]
Int. Cl.² F16D 65/02
U.S. Cl. 188—73.3 **3 Claims**



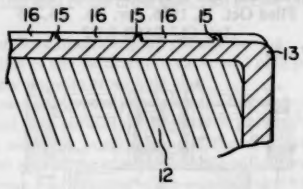
1. A disc brake comprising a stationary member secured to a non-rotatable part of a vehicle, a caliper member, at least one pin secured to one of said members and the other member having a corresponding guide bore therein in which said pin is slidably positioned for slidably supporting the caliper member on the stationary member, and a rigid sleeve is secured to said other member around the open end of the guide bore and extending in the direction of the axis of said pin and sealingly surrounding a portion of said pin projecting out of said guide bore.

4,051,927
DISC BRAKE

Yasuo Karasudani, Yokohama, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Aug. 13, 1976, Ser. No. 714,325
Claims priority, application Japan, Aug. 18, 1975, 50-113528
Int. Cl.² F16D 65/02
U.S. Cl. 188—73.3 **2 Claims**

1. In a disc brake wherein a caliper member is slidably supported by at least one pin on a stationary supporting member which is secured to a non-rotatable part of a vehicle, the pin being on one member and the other member having a guide hole therein slidably receiving the pin, the improvement comprising a bushing of resilient material and positioned between the peripheral surface of said pin and the peripheral surface of the guide hole, said bushing having at least one elongated groove in the peripheral surface thereof and extending in the direction of the axis of said pin for storing lubricant therein for feeding the lubricant between the bushing and the surface slidable relative to the bushing, said groove having longitudi-

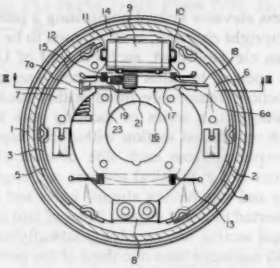


nally spaced walls therein partitioning the groove into a plurality of elongated recesses.

4,051,928
AUTOMATIC SHOE CLEARANCE ADJUSTING DEVICE IN SHOE DRUM BRAKE

Yoshihiro Hayashida, Chigasaki, Japan, assignor to Tokico Ltd., Japan

Filed May 26, 1976, Ser. No. 689,988
Claims priority, application Japan, May 30, 1975, 50-64995
Int. Cl.² F16D 65/56
U.S. Cl. 188—79.5 P **4 Claims**



1. An automatic shoe clearance adjusting device for adjusting the clearance between the drum and brake shoe linings of a brake system of the shoe-drum type, said adjusting device being of the type including a lever having a first end engaging with a first shoe and a second end, a strut of adjustable length and having a first end engaging with a second shoe and a second end, a supporting shaft pivotally connecting said second end of said lever with said second end of said strut, said strut comprising a first strut member contacting sid second shoe and having a hollow portion, a second strut member pivoted to said supporting shaft and having a threaded portion extending into said hollow portion of said first strut member, and an adjust nut threadingly engaging said threaded portion of said second strut member and having on the outer periphery thereof ratchet teeth, an adjust lever mounted on said surrounding shaft and having a pawl engageable with said ratchet teeth of said adjusting nut for rotating said adjusting nut on said threaded portion of said second strut member to move thereon in a direction toward said first strut member, and coil spring means mounted on said supporting shaft for transmitting compressive force to said adjust lever to normally move said pawl thereof into engagement with said ratchet teeth of said adjusting nut and for transmitting torsional force to said adjust lever, to thereby rotate said adjust lever about said supporting shaft and thereby rotate said adjust nut in response to movement of said lever; the improvement wherein:

said coil spring means has a first end engaging said adjust lever at a torsional force receiving point;

said adjust lever has means engaging said lever at a torsional force transmitting point;

said adjust lever has a portion engaging said lever at a fulcrum about which said adjust lever pivots in response to compressive force of said coil spring means;

said torsional force receiving point and said torsional force transmitting point being positioned adjacent each other and at distances approximately equally spaced from the central axis of said supporting shaft; and

said fulcrum being located at a position adjacent and closer to both said torsional force receiving point and said torsional force transmitting point than said central axis of said supporting shaft.

4,051,929

NON RETURN DEVICE

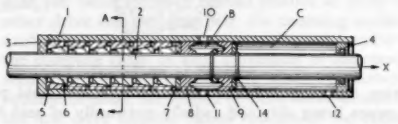
Norman Leslie Cyril Parfitt, Ashby-de-la-Zouch, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Sept. 15, 1976, Ser. No. 723,659

Claims priority, application United Kingdom, Oct. 31, 1975, 45213/75

Int. Cl.² F16D *65/54*

U.S. Cl. 188—196 C **9 Claims**



1. A device which in normal use restricts the relative movement between two members to one direction comprising, a first of the members able to support the second of the members, at least one wedge shaped element positioned to grip the second member, and urging means to urge said at least one wedge shaped element to abut a passageway within the first member to cause locking co-operation between the two members, the element and the urging means, the urging means being actuated by attempted relative movement of the members in a forbidden direction opposite to the said one direction.

4,051,930

DISC BRAKE WITH GRAPHITE FRICTION LININGS

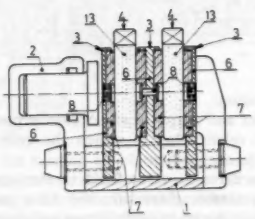
Jean Masclet, Paris, France, assignor to Messier-Hispano, Montrouge, France

Filed Sept. 7, 1976, Ser. No. 720,836

Claims priority, application France, Sept. 12, 1975, 75.28090

Int. Cl.² F16D *69/02*

U.S. Cl. 188—251 A **8 Claims**



1. A disc brake comprising a rotor element and a stator element, one of said elements including a mounting member provided with a friction lining formed at least in part by a plurality of graphite plates, each of said plates having two flat side faces and a peripheral surface which is perpendicular to said two flat side faces, each of said plates being received in a recess provided in a side face of said mounting member, each said recess having a flat bottom surface and being of a depth less than the thickness of said plate, the side wall of said recess being parallel to said peripheral surface of said plate and spaced from said peripheral surface of said plate by a distance greater than that necessary to permit thermal expansion and contraction between said mounting member and said plate means for retaining said plate in said recess, said graphite plates of one of said elements being formed of polycrystalline graphite, the other of said elements being formed as a unitary element of structural graphite.

4,051,931

HYDRODYNAMIC BRAKE

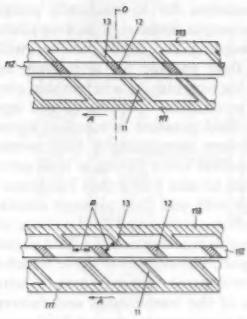
Denis Vignon, Friedrichshafen, Germany, assignor to Zahnradfabrik Friedrichshafen Aktiengesellschaft, Friedrichshafen, Germany

Filed June 11, 1976, Ser. No. 694,965

Claims priority, application Germany, June 14, 1975, 2526663

Int. Cl.² F16D *57/02*

U.S. Cl. 188—296 **9 Claims**



1. A hydrodynamic brake comprising:

a stator disk and a rotor disk coaxially juxtaposed, said disks having confronting faces each provided with an annular groove centered on the common axis of said disks, said disks being further formed with respective sets of angularly equispaced vanes subdividing each of said grooves into a multiplicity of pockets, said sets of vanes being aligned with each other in certain relative angular positions of said disks, the vanes of one of said disks being each split into first and second segments;

a housing rigid with said stator disk forming a toroidal chamber around said rotor disk; and

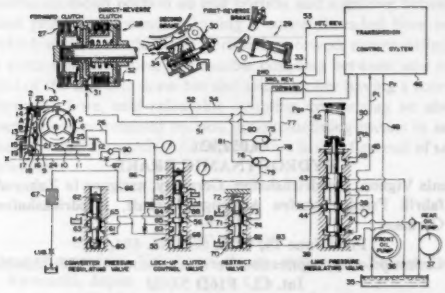
conduit means for alternately filling said chamber with hydraulic fluid and draining said fluid therefrom, the presence of said fluid in said pockets impeding the relative rotation of said disks;

said one of said disks being split into a body carrying said first segments and an annular insert centered on said axis, said insert carrying said second segments and being limitedly rotatable about said axis between a first and a second position relative to said body for mutually isolating the pockets of said split disk by relatively aligning said first and second segments in said first relative position and for interconnecting the last-mentioned pockets at locations remote from the other disk by relatively offsetting said first and second segments in said second relative position.

4,051,932
FLUID PRESSURE CONTROL SYSTEM FOR A HYDRAULIC TRANSMISSION WITH A LOCK-UP CLUTCH

Hajime Arai, Aichi, and Kiyoshi Ohnuma, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 21, 1975, Ser. No. 634,039
Claims priority, application Japan, July 16, 1975, 50-86919
Int. Cl.[2] F16D *37/00*; F16H *47/00*
U.S. Cl. 192—3.3 **2 Claims**



1. In a fluid pressure control system for a hydraulic transmission with a lock-up clutch of the type which comprises a hydraulic transmission for hydraulically coupling an input member with an output member, a lock-up clutch for directly mechanically coupling said input member with said output member and a fluid passage for selectively supplying fluid pressure to said lock-up clutch, wherein said clutch is adapted to effect direct mechanical coupling of said input and output members when fluid pressure is supplied through said fluid passage, said system comprising a fluid pressure source, a lock-up clutch control valve having at least one actuating port and being adapted to take a first shift condition of connecting said fluid passage with said fluid pressure source and a second shift condition of connecting said fluid passage with an exhaust passage according to whether or not a fluid pressure is supplied to an actuating port, a change-over valve which makes a selection between two control fluid pressures for actuating friction engaging means of the transmission and delivers one of said two control fluid pressures to a second fluid passage connected to said actuating port of said lock-up clutch control valve in a changing-over manner of traversing an intermediate stage where the supplies of said two control fluid pressures are both substantially intercepted, and a restrict valve provided in said second fluid passage so as to selectively intercept said second fluid passage, said restrict valve being constantly supplied with a governor pressure so as to be actuated by said governor pressure in a manner of being kept closed to intercept said second fluid passage when said governor pressure is below a predetermined level and of being kept opened to communicate said second fluid passage when said governor pressure is above a predetermined level.

4,051,933
LOW INERTIA CLUTCH AND BRAKE SYSTEM

Jene A. Beneke, McKinney, Tex.; Tsuruo Otsuka, South Holland, Ill.; Steven R. Otsuka, Duncanville, and Samuel G. Sarkisian, Dallas, both of Tex., assignors to Verson Allsteel Press Company, Dallas, Tex.

Filed Mar. 17, 1976, Ser. No. 667,700
Int. Cl.[2] F16D *67/04, 25/10*
U.S. Cl. 192—18 A **26 Claims**

1. A low inertia clutch and brake system comprising:

a rotatable shaft,

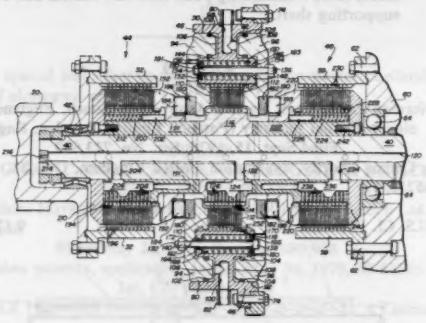
a low speed clutch assembly including friction clutch surfaces mounted about said shaft,

a high speed clutch assembly including friction clutch surfaces mounted about said shaft and spaced from said low speed clutch assembly,

a brake assembly disposed between said low and high speed clutch assemblies and including friction surfaces mounted about said shaft, said brake assembly normally engaged to prevent rotation of said shaft,

a stationary housing disposed about said brake assembly,

piston means mounted in said housing and operable in response to fluid pressure to selectively disengage said brake assembly and to engage one of said clutch assemblies,



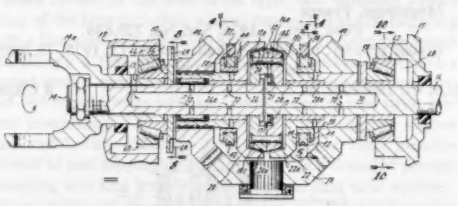
spring biased means associated with each of said piston means being disposed radially outwardly of said brake assembly for normally urging said piston means toward said brake assembly to normally engage said brake assembly, and

means for selectively applying fluid pressure to said piston means in order to disengage said brake assembly and to engage one of said clutch assemblies.

4,051,934
BIDIRECTIONAL DRIVE COUPLING

John W. Hurst, Port Huron, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Apr. 23, 1976, Ser. No. 679,529
Int. Cl.[2] F16D *43/21, 13/28*
U.S. Cl. 192—21 **19 Claims**



1. In combination:

rotatable input and output shafts coaxially positioned in an end-to-end relationship in which the ends are at least proximate to each other;

a first rotary drive member fixed to the input shaft and coaxially rotatable therewith, the drive member being positioned on the input shaft at least proximate the output shaft;

second and third rotary drive members positioned to each side of the first drive member, the second drive member being carried on the input shaft and the third drive member being carried on the output shaft, each being axially movable to engage the first drive member, adjacent portions of the first drive member and the second and third drive members being provided with cooperating means for forming a driving-driven relationship when either of

the second or third drive members is axially moved into contact with the first drive member thereby causing rotation of the second or third drive member by the first drive member upon its rotation;

means for selectively placing the second and third drive members into individual contact with the first drive member and for placing both of the second and third drive members out of contact with the first drive member;

two rotary gears, one gear being adjacent a side of the second drive member opposite the side which contacts the first drive member, and being in a substantially axially fixed position on the input shaft, the other gear being adjacent a side of the third drive member opposite the side which contacts the third drive member, and being substantially axially fixed on the output shaft, the one gear being rotatable on the input shaft and the other gear being fixedly attached to the output shaft for rotation therewith, the gears and second and third drive members forming two drive member-adjacent gear pairs;

a plurality of complementary, radially distributed, overlapping helical camming surfaces on adjacent portions of the second and third drive members and the gears, the surfaces extending between each drive member-gear pair to drivingly couple them together for rotation, the complementary driving helical surfaces of one drive member-gear pair being opposite handed relative to those of the other drive member-gear pair, the camming surfaces of each pair being in mutual overlapping relationship over the complete range of axial movement of the respective second or third drive members whereby contact and rotation of either the second or third drive member with the first drive member causes rotation of the respective adjacently coupled gear through driving engagement between the corresponding complementary camming surfaces and the driving engagement of the camming surfaces urges the second and third drive member axially toward the drive member for more positive contact therewith while continuing to rotate the adjacent gear, and

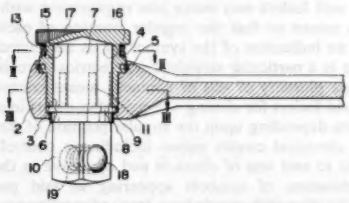
gear means interconnecting the two rotary gears whereby rotation of the gear on the input shaft causes rotation of the gear on the output shaft.

4,051,935

WORK TOOL

Eiji Nakayama, 1140 Yokkamachi, Sanjo, Japan (955)

Filed Apr. 15, 1976, Ser. No. 677,136
Claims priority, application Japan, Apr. 18, 1975, 50-46329
Int. Cl.² F16D *41/08*
U.S. Cl. 192—44 **7 Claims**



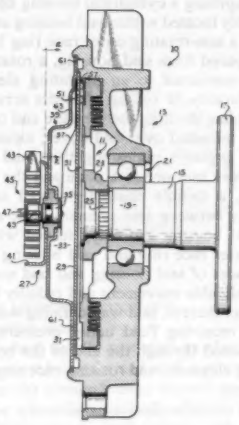
1. A tool for turning an object comprising: a tool handle having a head portion; a hollow cylinder encased in said head portion having a knob for switching rotational directions, a plurality of axial slots equally spaced around the circumference of said cylinder and having one or more openings provided at the upper portion thereof; a shaft of polygonal shape housed in said cylinder; rollers contained in said slots, said roller diameter being larger than the thickness of said cylinder and the number of said rollers and slots being similar to that of sides of said polygon; one or more steel balls contained in said one or more openings, said steel ball diameter being larger than the thickness of said cylinder and located between said rollers; resilient means inwardly pressing said steel balls to abut the sides of said polygonal shaft whereby said rollers travel along the sides of said polygonal shaft and each is locked at either extreme end of travel so that said polygonal shaft may be turned in one direction when said tool handle is swung in one direction and said shaft will not turn when said tool handle is swung in the opposite direction.

4,051,936

FLUID COUPLING DEVICE AND VALVE SUPPORT USED THEREIN

Richard T. Crisenbery, Parma, and Thomas H. Tinholt, Marshall, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed June 3, 1976, Ser. No. 692,402
Int. Cl.² F16D *35/00, 43/25*
U.S. Cl. 192—58 B **18 Claims**



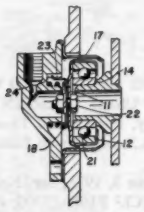
1. A fluid coupling device including a first rotatable member, cover means associated with said first member to define a fluid chamber therebetween, a valve plate disposed to separate said fluid chamber into a fluid operating chamber and a fluid reservoir chamber, a second rotatable member disposed in said fluid operating chamber and being rotatable relative to said first member, said valve plate defining a discharge orifice adapted to permit the flow of fluid from said fluid operating chamber to said reservoir chamber, a generally flat valve member located within said fluid reservoir chamber and disposed to move in a plane substantially parallel to the plane of said valve plate, said valve member further being disposed to cooperate with said discharge orifice to vary the effective flow area thereof, temperature-responsive means operatively associated with said valve member to control the movement of said valve member, the range of movement of said valve member defining a valve operating area, one of said cover means and said valve plate including a generally planar restraining portion coextensive at least with said valve operating area, oriented substantially parallel to the plane of movement of said valve member and closely spaced therefrom during said valve member movement and being operable to engage said valve member in a surface-to-surface relationship and prevent excessive movement of the portion of said valve member adjacent said discharge orifice in a direction away from said valve plate.

4,051,937

HYDRAULIC CLUTCH RELEASE MECHANISM FOR MOTOR VEHICLES

Roy Peter Garrett, Luton; Derek Ray Parkins, Dunstable, both of England; Manfred Brandenstein, Aschfeld, and Armin Olschewski, Schweinfurt, both of Germany, assignors to SKF Industrial Trading and Development Company B.V., Amsterdam, Netherlands

Division of Ser. No. 349,298, April 9, 1973, abandoned. This application Jan. 26, 1976, Ser. No. 652,244
Int. Cl.[2] F16D 25/08
U.S. Cl. 192—88 A 6 Claims



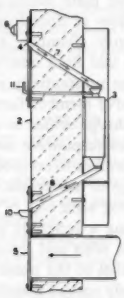
1. A hydraulic release mechanism for automotive clutches and the like comprising a cylindrical housing open at one end, a bearing assembly located within said housing at said open end and comprising a non-rotating outer race ring having a cylindrical surface spaced from said housing, a rotatable race ring adapted to be connected to an operating element for said clutch and a plurality of rolling elements arranged therebetween, a cover plate abutting the pressure end of said bearing, a pressure plate mounted over said cover, means for securing said cover and pressure plates together, and spring means interposed between said pressure plate and the opposing wall of said housing, a flexible elastomeric wall secured to said bearing assembly between said pressure plate and said cover plate and to said housing and being folded within the space between said outer race ring and said housing to engage the cylindrical surfaces of said housing and said nonrotating race ring for axially slidable movement and radially floating movement with respect thereto, said wall defining with said housing a chamber for receiving fluid under pressure, the force of which is transmitted through the end of the nonrotating race ring, said rolling elements, and rotating race ring to said clutch operating element.

4,051,938

MEANS FOR OUTSIDE VENDING

Kenneth G. Brown, Wickham Ave., Mattituck, N.Y. 11952

Filed June 1, 1976, Ser. No. 691,229
Int. Cl.[2] G07F 9/06
U.S. Cl. 194—1 K 7 Claims



1. Means for installing, inside an exterior building wall, a vending machine coin box comprising,

a coin box mounted on the inside of the exterior building wall, the coin box having a coin receiving aperture, a coin return slot and a coin return lever,

a first chute mounted in the exterior building wall and connected to the coin receiving aperture, said first chute extending downwardly from the outside of the wall,

a second chute mounted in the exterior building wall connected to the coin return slot, said second chute extending downwardly from the inside to the outside of the wall,

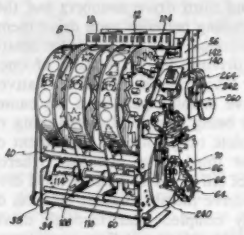
whereby the coin box is protected from vandalism and burglary by the exterior building wall.

4,051,939

COIN OR TOKEN OPERATED AMUSEMENT DEVICE

Francis T. Murphy, Glenview; Peter Sagan, Chicago; Martin B. Rosenthal, Park Forest, and Alfred R. Ostrowski, Oak Forest, all of Ill., assignors to The Seeburg Corporation, Chicago, Ill.

Filed Sept. 27, 1973, Ser. No. 400,726
Int. Cl.[2] A63F 5/04
U.S. Cl. 194—10 7 Claims



1. An amusement device comprising a rotatable wheel shaft, a plurality of wheels, one way clutches independently mounting each wheel on said wheel shaft whereby said wheels may be rotated in one direction when said shaft is rotated in that direction and are free to rotate in the same direction after said wheel shaft has stopped rotating, each wheel having a plurality of symbols appearing thereon, a plate mounted on each wheel and rotatable therewith, each plate having a plurality of stop means positioned thereon corresponding to various of said symbols on said wheels, a feeler shaft spaced from and coextensive with said wheel shaft, a plurality of feelers, one corresponding to each of said wheels mounted on said feeler shaft for rotation toward said wheel shaft and said stop means, means for stopping the rotation of each wheel sequentially, means for first restraining said feelers from rotation toward said wheel shaft and said stop means and then releasing them whereby said feelers may move into engagement with one of said stop means so that the angular position of each feeler provides an indication of the symbol on its associated wheel appearing in a particular straight line, electrical circuit means including a plurality of sets of contacts, means connected to each of said feelers for closing one pair of contacts in each set of contacts depending upon the angular position of the feeler, and said electrical circuit means including a control means connected to said sets of contacts and operative in the event the combination of symbols appearing in said particular straight line after said wheels have stopped rotating to provide an indication that a player has won.

4,051,940

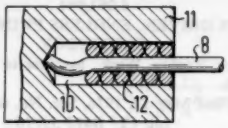
MOSAIC NEEDLE PRINTER HEAD USING PLUNGER ARMATURE SOLENOID ARRANGEMENTS

Peter Kuelzer, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 12, 1975, Ser. No. 603,937
Claims priority, application Germany, Aug. 14, 1974, 2439098
Int. Cl.[2] B41J 3/44
U.S. Cl. 197—1 R 3 Claims

1. In a printer needle-plunger armature assembly for use in a

mosaic needle printer head including a solenoid-actuated plunger armature and a printer needle operatively secured thereto, the improvement comprising means for connecting said printer needle and plunger armature in assembled relation, said connecting means comprising wall means forming a blind bore and an end wall in said plunger armature, means forming an end portion on said printer needle for insertion into said bore for abutment with said end wall, said connecting means including elastically deformable gripping means for holding said end portion of said printer needle in said bore, and means forming a helically wound wire disposed in said blind bore and



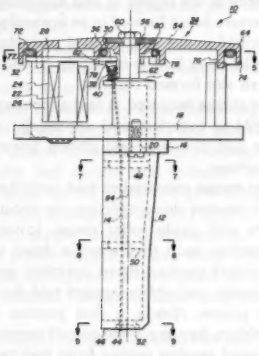
having a longitudinal dimension less than the corresponding dimension of said bore whereby said end wall of said bore and the inner end of said helically wound wire are disposed in spaced relation, said elastically deformable gripping means comprising a lateral deformation formed at the terminus of said end portion of said printing needle, said lateral deformation being straightened from a deformed condition to a straight condition upon being inserted into said helically wound wire and again assuming its deformed condition after it passes through said helically wound wire into the space in said bore between said end wall and said helically wound wire.

4,051,941

MATRIX PRINT HEAD WITH IMPROVED ARMATURE RETAINER

Donald G. Hebert, San Ramon, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed June 28, 1976, Ser. No. 700,417
Int. Cl.² B41J *3/50*
U.S. Cl. 197—1 R **7 Claims**



1. In a matrix print head comprising stylus guide means; a plurality of electromagnetic structures coupled to said guide means, each of said electromagnetic structures including a pole piece; a plurality of armatures disposed radially about said guide means, each of said armatures being associated with one of said electromagnetic structures to form an electromagnetic actuator for transferring electromechanical energy to a stylus, and each of said armatures having an inner end and an outer end projecting outwardly of the associated pole piece; a plurality of styli respectively associated with said plurality of armatures; each of said styli being carried by said guide means and having an armature engaging end for engaging the inner end of the associated armature and a printing end for impacting a record medium when the stylus is propelled through said guide means by energization of the associated electromagnetic actuator; an improved armature retainer coupled to said guide means for maintaining each armature in engagement with its associated pole piece; said armature retainer comprising:

a relatively rigid base member having a central portion connected to said guide means and a peripheral portion including means for receiving each armature at a predetermined location between its inner and outer ends; and

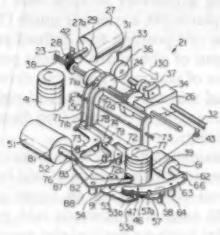
a first relatively resilient O-ring mounted to the peripheral portion of said base member for simultaneously engaging the outer end of each armature in order to simultaneously bias each armature into engagement with its associated pole piece.

4,051,942

PRINTING APPARATUS

Takeo Suzuki; Ikutaro Inoue; Hideo Tamai, and Masatsugu Aoki, all of Soma, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Oct. 12, 1976, Ser. No. 731,460
Claims priority, application Japan, Oct. 11, 1975, 50-122787
Int. Cl.² B41J *1/24*
U.S. Cl. 197—49 **10 Claims**



1. A printing apparatus comprising:

a rotatable spline shaft;

a first type wheel fixedly mounted on the spline shaft, the first type wheel being formed with a plurality of first type symbols on the circumference thereof;

a second type wheel longitudinally slidably mounted on the spline shaft for unitary rotation therewith, the second type wheel being formed with a plurality of second type symbols on the circumference thereof;

type selector drive means for rotating the spline shaft and thereby the first and second type wheels for type symbol selection;

stepping drive means for steppingly moving the second type wheel along the spline shaft from a first position to a second position;

a first printing hammer movably disposed adjacent to the first type wheel;

a second printing hammer movably disposed adjacent to the second type wheel, the second printing hammer extending between the first and second positions;

reciprocating drive means having reciprocating actuator member connected to the stepping drive means; and

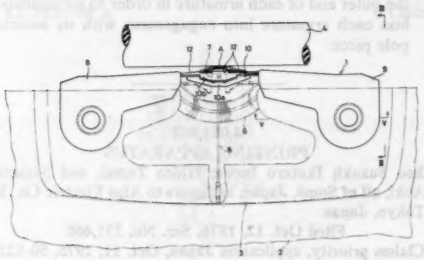
hammer selector means for selectively connecting one of the first and second printing hammers to the actuator member in such a manner that the actuator member moves the selected one of the first and second printing hammers to strike the respective one of the first and second type wheels for printing when the actuator member is moved in a first direction and actuates the stepping drive means to move the second type wheel along the spline shaft by one step when the actuator member is moved in a second direction which is opposite to the first direction.

4,051,943

RIBBON CARTRIDGE

Masami Hanazono; Yukio Hishida; Toshio Nakai, all of Nagoya; Tomoyoshi Watanabe, Chiryu; Takanobu Hirayama, Chita, and Hideo Asakura, Kasugai, all of Japan, assignors to Brother Industries, Ltd, Nagoya, Japan

Filed Dec. 17, 1975, Ser. No. 641,673
Claims priority, application Japan, Jan. 9, 1975, 50-6308[U]
Int. Cl.[2] B41J *33/518*
U.S. Cl. 197—151 **1 Claim**



1. A ribbon cartridge adapted to be removably installed on a typewriter having a plurality of type bars **(5)** with printing head portions, a platen **(4)**, a type bar guide **(7)** to guide a type bar **(5)** from an at rest position to a defined print point **(A)** on the platen **(4)**, a pair of ribbon drive means positioned on laterally opposite sides of said print point and driven in response to a typing action of said type bars **(5)**, and ribbon feed and reverse means for changing the ribbon feed direction, said ribbon cartridge comprising:

a. a pair of housings **(8,9)** which are positionable upon each of said ribbon drive means, each of said housings including an upper wall **(11*c*)** having an upper aperture, an arm portion **(11*b*)** extending towards said print point **(A)**, a side wall **(11*a*)** having a vertical slot aperture **(13)** to allow a ribbon to pass into said arm portion **(11*b*)** and a bottom wall **(19)** having a bottom aperture **(20)**;

b. a ribbon spool **(27)** rotatably mounted in each of said housings, including pin connecting means which will be operatively connected to said ribbon drive means through said bottom aperture of said bottom wall when said housings are positioned on said ribbon drive means of said typewriter, and having a hand-operated turning knob extending upwardly through said upper aperture;

c. a ribbon wound on said ribbon spools and passing through said vertical slot apertures **(13)** and adapted to cross in front of said print point **(A)** when fed from one ribbon spool **(27)** to the other; said ribbon having a ribbon reverse eyelet **(42)** near each end portions of said ribbon;

d. a connecting arm member for connecting said two housings **(8,9)** made of a rigid metal strip, which has arm sections rigidly connected with said arm portions **(11*b*)** and has a center portion **(10*a*)** positioned in front of said type bar guide **(7)**, said center portion of said connecting arm member having a U-shaped opening **(10*b*)** which permits the head portions of said type bars to pass through from an at rest position and strike said ribbon at said print point in a printing operation; and,

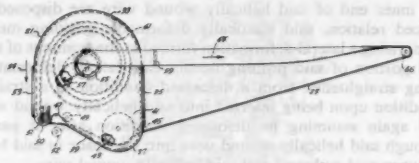
e. an actuator **(40)** with bias means **(44)** pivotally mounted in each of said housings between said upper wall **(11*c*)** and said bottom wall **(19)** and usually biased for one direction, and being operatively connectable to said ribbon feed and reverse means, said actuators **(40)** respectively having a narrow slit **(41)** through which to allow passage of said ribbon, but not allow passage of said ribbon reverse eyelet **(42)**, and said actuator **(40)** being rotated together with said ribbon reverse eyelet **(42)** in a direction away from said ribbon spool against a biasing force of said bias means **(44)** and actuating said ribbon feed and reverse means so as to change the ribbon feeding direction, when said ribbon is fed from one ribbon spool to the other in response to a typing action and said ribbon reverse eyelet on the side of said ribbon spool which is supplying said ribbon arrives at the slit of said actuator on the same side of said ribbon supplying spool.

4,051,944

CAPSTAN DRIVEN, ENDLESS PRINTER RIBBON CARTRIDGE

David G. Starr, Renton, Wash., assignor to Tally Corporation, Kent, Wash.

Filed May 17, 1976, Ser. No. 687,171
Int. Cl.[2] B41J *33/10*
U.S. Cl. 197—168 **10 Claims**



1. A capstan driven, endless printer ribbon cartridge comprising:

a generally flat cartridge housing suitable for housing a printer ribbon, said cartridge housing having a top wall, a base wall and an edge wall joining said top and base walls, said cartridge housing including an outwardly projecting appendage lying generally in the plane of the housing, said cartridge housing also including a ribbon inlet slot and a capstan drive aperture both located in the edge wall of said housing in the region of said appendage, said capstan drive aperture being formed in an inwardly curving indentation formed in the edge of said cartridge housing, said cartridge housing further including a central hub having a ribbon exit slot formed therein;

guide roller means mounted in said appendage for receiving printer ribbon entering said appendage via said ribbon inlet slot and directing said ribbon toward said capstan drive aperture;

pinch roller means mounted in said cartridge housing adjacent said capstan drive aperture for receiving ribbon directed by said guide roller means toward said capstan drive aperture such that when a drive capstan is positioned in said capstan drive aperture, said pinch roller means presses said ribbon against said drive capstan;

an endless printer ribbon, a first portion of said endless printer ribbon forming a ribbon roll surrounding said hub and a second portion exiting from said cartridge housing via said ribbon exit slot and entering said cartridge via said ribbon inlet slot; and,

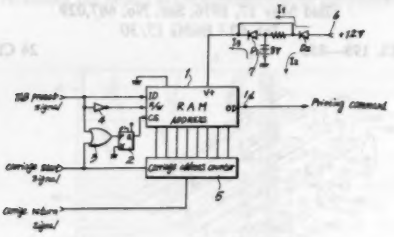
a leaf spring affixed to said hub and projecting outwardly therefrom toward said ribbon roll, said leaf spring including a hook-shaped outer end curved in the direction of said tape exit slot;

said leaf spring and said ribbon exit slot radially positioned about said hub such that said leaf spring holds said ribbon roll away from said hub in a manner such that an open space is formed between the hook-shaped end of said leaf spring and said ribbon exit slot, said ribbon passing through said space, directly from said leaf spring to said ribbon exit slot without impinging on the outer surface of said central hub after leaving said leaf spring.

4,051,945
ELECTRONIC TABULATOR FOR HIGH SPEED PRINTERS

Isao Fujimoto, Kunitachi; Takeshi Kasubuchi; Masahiko Aiba, both of Nara, and Yoichi Shimazawa, Yamatokoriyama, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation and Sharp Kabushiki Kaisha, both of Tokyo, Japan

Filed Aug. 12, 1975, Ser. No. 603,924
Claims priority, application Japan, Aug. 12, 1974, 49-92493
Int. Cl.[2] B41J *21/00*; H02J *9/06*
U.S. Cl. 197—176 1 Claim



1. In a tabulator for use in high speed printers to provide print command signals as a function of the coincidence between a stored carriage position signal and a generated carriage position signal, in combination:

random access memory means storing a plurality of signals representative of carriage positons to be tabulated;

a carriage counter means for providing address signals representative of detected carriage positions in response to generated carriage position signals;

said random access memory means being responsive to the coincidence of said position address signals and said stored carriage position signals for providing a printing command signal;

power supply means driving said random access memory means and sustaining the information stored therein;

a rechargeable battery; and

circuit means continuously interconnecting said battery with said power supply means and said random access memory means to simultaneously charge said battery and enable and sustain said memory means by said power supply means when said power supply means is operative and sustain said memory by said battery when said power supply means is inoperative;

wherein said power supply means, when operative, has a first terminal voltage and wherein said battery means has a second terminal voltage of lesser magnitude than said first; and

wherein said circuit means comprises first and second diode means each having an input and output side and each connected in the forward direction thereof in series from said power supply adjacent said first diode means to said random access memory means adjacent said second diode means;

said battery having one terminal thereof connected to the output side of said first diode means and the input side of said second diode means;

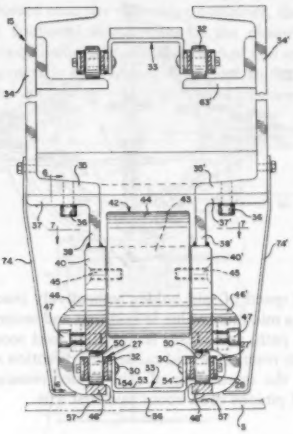
said random access memory means receiving power from said power source through both said diode means and said battery being charged from said power source through said first diode means; and

said random access memory means receiving power from said battery through said second diode means upon failure of said power source.

4,051,946
MAGNETIC CONVEYOR

Dario Buccicone, Crown Point, Ind., assignor to Bucciconi Engineering Co., Inc., Gary, Ind.

Filed Mar. 12, 1976, Ser. No. 666,183
Int. Cl.[2] B65G *17/46*
U.S. Cl. 198—477 10 Claims



1. A rail type magnetic conveyor unit for conveying magnetizable metal sheets comprising an elongate support frame, a plurality of magnets supported in spaced relation on said frame, a pair of transversely spaced, endless conveyor chains carried on spaced pairs of end sprockets which are mounted in longitudinally spaced relation on said support frame, guide rail members extending in transversely spaced relation along the bottom of said support frame, said conveyor chains having rollers positioned for riding on said guide rail members so as to traverse a straight path along the bottom of said support frame, and sheet carrying bracket assemblies extending between said conveyor chains, each of said magnets having depending laterally spaced pole extensions supporting portions of said guide rail members along opposite sides of said support frame, said magnets being positioned and arranged to exert magnetic force sufficient to hold sheets relative to said bracket assemblies so that the sheets travel with said conveyor chains.

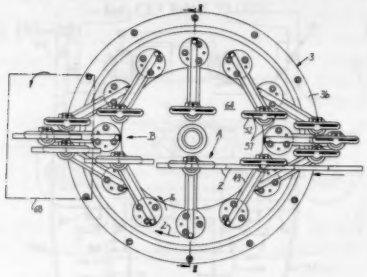
4,051,947
TRANSFER APPARATUS FOR CIGARETTES OR THE LIKE

Peter Schumacher, and Helmut Niemann, both of Hamburg, Germany, assignors to Hauni-Werke Korber & Co. KG, Hamburg, Germany

Filed Oct. 22, 1976, Ser. No. 735,084
Claims priority, application Germany, Nov. 5, 1975, 2549512
Int. Cl.[2] B65G *47/22*
U.S. Cl. 198—478 11 Claims

1. Apparatus for transferring cigarettes or analogous rod-shaped articles between first and second paths along which the articles respectively move lengthwise and sideways, comprising a planet carrier rotatable about a first axis; a first pinion rotatably supported by said carrier; a crank rotatable with and having a portion remote from the axis of said pinion; an article holder turnably supported by said portion of said crank; a second pinion coaxial with and rotatable relative to said first pinion; means for articulately coupling said second pinion with said holder so that the angular position of said holder with respect to said second pinion remains unchanged when the latter rotates about the axis of said first pinion; means for rotating said carrier in a predetermined direction; means for rotating said first pinion through one revolution counter to said

direction in response to each revolution of said carrier and for thereby orbiting said holder about the axis of said first pinion so that said holder travels along an endless third path having a first portion at a minimum distance from said first axis and nearer to said first path and a second portion at a maximum distance from said first axis and nearer to said second path, the



tangential speed of said holder respectively reaching a maximum and a minimum value in said first and second portions of said third path; and means for rotating said second pinion in response to rotation of said carrier in a direction and at a speed such that the orientation of said holder remains unchanged while said pinions orbit about said first axis.

4,051,948

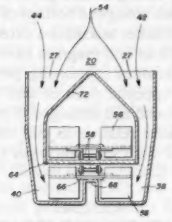
DUAL CONVEYOR SYSTEM

Walter James Sackett, Sr., Severna Park, Md., assignor to The A. J. Sackett & Sons Company, Baltimore, Md.

Continuation-in-part of Ser. No. 613,909, Sept. 16, 1975, abandoned. This application Dec. 6, 1976, Ser. No. 747,828

Int. Cl.[2] B65G *47/18*

U.S. Cl. 198—550 **13 Claims**



1. In a bulk material conveyor system having an input end and an output end, a conveyor apparatus which is secure against mixing of dissimilar conveyed materials which are being conveyed simultaneously and which comprises:

a housing structure formed of a pair of opposed section means;

a means for separating said pair of opposed section means to form upper and lower passageways;

a single continuous chain conveyor means disposed centrally within said upper and lower passageways, an upper portion of the said conveyor means being positioned within said upper passageway and being supported by and riding on the upper surface of said means for separating said pair of opposed section means, and a lower portion of said conveyor means being positioned within said lower passageway;

means for driving said continuous conveyor means;

a plurality of dual flight means spaced along and carried by said continuous conveyor means;

bulk materials receiving means disposed at the input of said conveyor system for receiving bulk material, said bulk materials receiving means having separate ports to receive two said dissimilar materials;

separate conveyor chamber trough means in said lower passageway to maintain separation of said dissimilar materials, and in which separate sections of said dual flight means travel; and

discharge means at the output end of said conveyor system, having separate ports to said separate conveyor chamber trough means to discharge two said dissimilar materials.

4,051,949

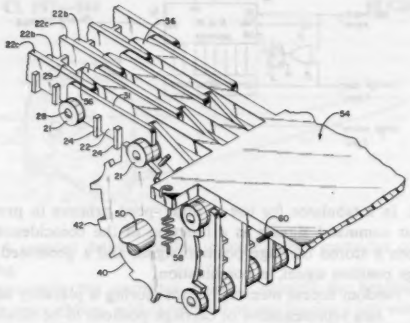
CONVEYOR SYSTEM

James M. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, New Orleans, La.

Filed May 17, 1976, Ser. No. 687,029

Int. Cl.[2] B65G *15/30*

U.S. Cl. 198—853 **24 Claims**



1. In a module for constructing a conveyor belt to be driven around a circular arc segment for use in conjunction with a conveyor comb having a plurality of spaced-apart parallel teeth, which module includes first and second like pluralities of link ends of substantially identical width, each being formed to circumscribe a pivotal hole through said width, said holes of said first plurality being arranged coaxially, said holes of said second plurality being arranged coaxially, the axes of respective holes of both pluralities of link ends being substantially parallel; and a plurality of spaced apart elongated members each integrally formed with and joining a pair of corresponding link ends of said first and second pluralities, said members being joined by at least one cross member also formed integrally therewith; said link ends being dimensioned and spaced apart by a distance slightly greater than said width;

the improvement wherein said plurality of elongated members comprises first and second groups, said elongated members of said first group having upper surfaces disposed at a first like height not below the upper surface of said cross member said members of said second group having upper surfaces disposed at a second like height above the height of said upper surfaces of the elongated members of said first group;

said first and second groups being arranged to form a multiplicity of channels adapted to receive said teeth.

4,051,950

HYGIENIC PROTECTIVE SHIELD

Harry Sigurd Valdemar Järund, Lund, Sweden, assignor to Jarund Devello AB, Fjallbacka, Sweden

Filed June 23, 1975, Ser. No. 589,062

Claims priority, application Sweden, June 26, 1974, 7408416; Aug. 5, 1974, 7410017

Int. Cl.[2] B65D *85/38*

U.S. Cl. 206—306 **6 Claims**

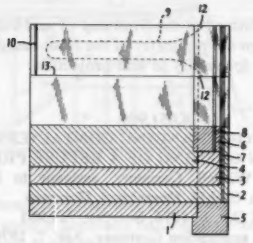
1. An hygienic protecting shield for an object, such as a seat shield, a protecting glove, a shield for a thermometer or other

temperature sensing devices, and a shield for other instruments, which shield comprises:

two adjacent plastic foils at least one of which is at least the same length as the part of the object to be received in the shield;

at least one covering foil arranged on the outside of each of the two plastic foils to form at least four foil layers, the covering foils being shorter than the plastic foils and further arranged thereon to expose one end of the plastic foils;

means removably attaching each covering foil to the adjacent plastic foil and sealing the plastic foils to each other along a line defining an object-receiving space between the plastic foils which is a least partly cut off from the remaining parts of the plastic foils and has an opening for receiving the object at the exposed end of the plastic foils,



the attaching and sealing means being spaced inwardly from at least a portion of an edge of the foils which is sufficiently close to the exposed end of the plastic foils and adapted in combination with the covering foils for facilitating a sidewise tearing of the object-receiving part of the plastic foils from the covering foils and the remainder of the plastic foils; and

a stiffening strip on the exposed end of each plastic foil which overlaps the corresponding covering foil, whereby the object-receiving part of the plastic foils is covered with the covering foils and stiffening strips until the shield is used to prevent contamination thereof and, for use, the object can be inserted between the stiffening strips into the object-receiving space between the plastic foils and the stiffening strip and the end portion of the shield then grasped and easily separated to provide an hygienic foil shield about the object.

4,051,951

PACKAGE HAVING MEANS FOR PROVIDING COAXIAL ALIGNMENT IN A STACK THEREOF

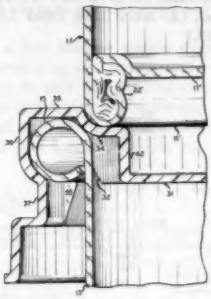
Ernest L. Smith, Kansas City, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 18, 1975, Ser. No. 588,130
Int. Cl.² B65D *21/02, 43/08, 5/68*
U.S. Cl. 206—508 **14 Claims**

1. A package comprising a container and a closure therefor;

said container having a circumferentially continuous sidewall and a bottom member, said bottom member being situated within the space defined by said sidewall adjacent the lower end of said sidewall, the upper portion of said sidewall curling outwardly and downwardly to form a rolled top rim, the lower portion of said sidewall curving inwardly to form a generally convexly curved bottom rim;

said closure comprising a first wall, a circumferentially continuous generally concavely curved second wall extending upwardly and outwardly from the upper extent of said first wall, a circumferentially continuous rim wall extending outwardly from the upper extent of said second wall, a circumferentially continuous skirt wall extending generally downwardly from the outer extent of said rim wall, and a diaphragm connected to the lower extent of said first wall; said first wall at least generally conforming to the contour of the portion of said sidewall adjacent to and below the commencement of said rolled top rim; the maximum outside diameter of said first wall before the application of said closure onto its respective container being at least as great as the minimum corresponding dimension of the inside surface of the portion of said sidewall contacted by said first wall upon the application of the closure onto the respective container, thereby providing a frictional engagement of the closure and the respective container; the configuration of said second wall at least generally conforming to at least an outer portion of said curved bottom rim to provide a positioning means



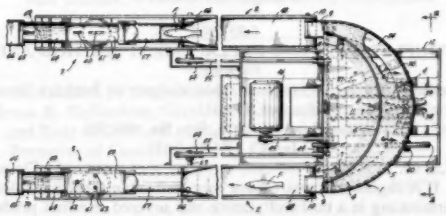
for engaging the corresponding portion of the curved bottom rim of an at least substantially identical container superimposed thereabove as said curved bottom rim of said superimposed container enters the space defined by said second wall, thereby causing said superimposed container to be positioned on said second wall coaxially with said closure; said first wall being interrupted by a plurality of spaced apart support lugs which project inwardly from said first wall toward the central vertical axis of said closure, the upper surface of each of said plurality of support lugs extending inwardly from the lower extent of said second wall to serve as additional support surface for the curved bottom of said superimposed container.

4,051,952

FISH CHARACTERISTIC DETECTING AND SORTING APPARATUS

Edward G. Hauptmann, and John Richard Green, both of West Vancouver, Canada, assignors to Neptune Dynamics Ltd., North Vancouver, Canada

Filed Sept. 5, 1975, Ser. No. 610,661
Claims priority, application Canada, Sept. 9, 1974, 208741
Int. Cl.² B07C *5/34*
U.S. Cl. 209—73 **18 Claims**



1. Apparatus for sorting fish including detector means for detecting a characteristic of fish, fish-moving means for moving fish past the detector means, and channeling means opera-

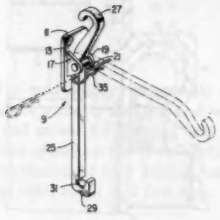
ble in response to the detector means to channel fish in accordance with the effect of the fish on the detector means, the improvement comprising the fish-moving means including fish-orienting and fish-singling means spaced a substantial distance from the detector means for orienting fish in disarray for lengthwise movement headfirst in single file, and substantially horizontal fish-accelerating means between said fish orienting and fish-singling means and the detector means for accelerating the fish in single file to space them apart prior to their movement past the detector means.

4,051,953

PIVOTAL SUPPORT

Walter D. Shoaf, R.D. 2, Atwood Drive, Belle Vernon, Pa. 15012

Filed Mar. 11, 1976, Ser. No. 665,055
Int. Cl.[2] A47F 5/08; D06F 53/00
U.S. Cl. 211—119.1 **4 Claims**



1. A pivotal support for use on a recreational vehicle comprising in combination:

a mounting plate adapted to be flush-mounted to an exterior surface of said vehicle and having a pair of spaced apart ears extending outwardly thereof;

a pivot pin carried by the ears in spaced relation to the mounting plate;

an arm positioned in a storage position between said pin and said plate and slidable relative thereto;

said arm including an aperture;

a hitch pin adapted to grip said arm via said aperture to lock it in said storage position;

said arm terminating in a forward hook and a rear abutment,

said abutment having an offset slot for receiving said pivot pin to permit the arm to be pivoted from the storage position to an operative position oriented approximately 90° from said storage position with the abutment bearing against said mounting plate when the arm is in the operative position to maintain the arm in said operative position; and,

the thickness of said arm between the forward hook and rear abutment being less than the distance between the pivot pin and said mounting plate whereby the arm is moved from said storage position by sliding the portion of the arm between said forwrd hook and said rear abutment upwardly for pivoting about the pivot pin into said operative position.

4,051,954

COUPLER BUTT END REPLACEMENT METHOD AND PART

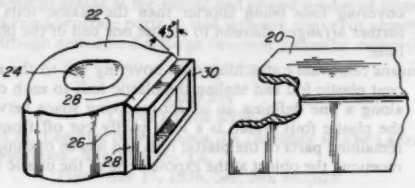
Leslie N. Roberts, Columbus, Ohio, assignor to Buckeye International, Inc., Columbus, Ohio

Filed June 10, 1976, Ser. No. 694,781
Int. Cl.[2] B61G 9/00
U.S. Cl. 213—62 R **14 Claims**

1. A replacement part for a coupler having a hollow shank terminating in a butt end portion and severed at a first predetermind position to provide a front coupler portion having a hollow rear end defined by the severed perimeter wall of said shank, the improvement comprising:

a butt end part having a size corresponding to the original size of the severed butt end portion and having a front end with a perimeter sized and shaped to correspond with the rear end of said perimeter wall,

a projection on the front end of said part spaced inwardly of the perimeter of said part receipt in said hollow shank,



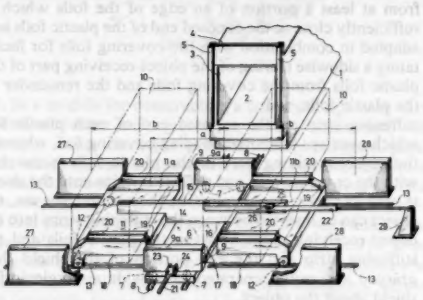
and a chamfer formed at the front end of said butt end part extending from the perimeter of the front end of said part inwardly and forwardly to said projection.

4,051,955

APPARATUS FOR CHANGING CONTAINERS AT AN EJECTION OPENING OF A REFUSE PRESS

Dietmar Kaffka, Willich, Germany, assignor to Lindemann Maschinenfabrik GmbH, Dusseldorf, Germany

Filed Oct. 6, 1976, Ser. No. 729,981
Claims priority, application Germany, Apr. 7, 1976, 2614921
Int. Cl.[2] B65B 63/02
U.S. Cl. 214—1 BB **4 Claims**



1. In apparatus for changing containers at an ejection opening of a refuse press, said apparatus comprising a transverse carriage, means for moving said transverse carriage in a direction transversely of a direction of pressing of said press, container supports on said transverse carriage, means for raising and lowering said supports, a longitudinal carriage with which said transverse carriage is arranged to co-operate, means for moving said longitudinal carriage in said direction of pressing towards and away from said ejection opening, and a rigid container support on said longitudinal carriage, said supports of said transverse carriage and said support of said longitudinal carriage being so arranged that a container resting on a support of said transverse carriage can be moved by said support of said longitudinal carriage into a pressing position at said ejection opening, the improvement wherein said transverse carriage comprises a first part and a second part, wheels movably mounting said first part on one side of said longitudinal carriage, further wheels movably mounting said second part on an opposite side of said longitudinal carriage, a member spanning said longitudinal carriage and rigidly interconnecting said first part and said second part of said transverse carriage, two stationary container storage supports, said stationary container storage supports being disposed one at one side of said longitudinal carriage and the other at an opposite side of said longitudinal carriage and being so located that said supports of said

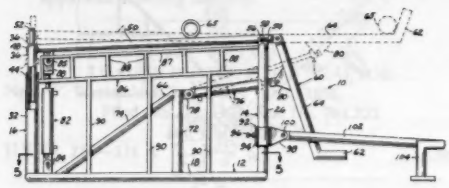
transverse carriage are capable of transferring containers to and from said stationary container storage supports and said means for moving said transverse carriage being adapted to move said carriage between first and second limiting end positions and said supports of said transverse carriage being located one on said first part and the other on said second part of said transverse carriage.

4,051,956

HORIZONTAL PIPE HANDLING APPARATUS

J. T. Teague, P.O. Box 701, Elk City, Okla. 73644

Filed July 26, 1976, Ser. No. 708,667
Int. Cl.[2] E21B *19/00*
U.S. Cl. 214—1 P **2 Claims**



1. Pipe handling apparatus, comprising:

a pair of upright generally rectangular stand means arranged in spaced-apart relation transversely of a work path along which sections of pipe are to be moved;

top rail means comprising an elongated top rail extending transversely of the work path and pivotally connected at one end portion with each said stand means for vertical pivoting movement of its other end portion about a horizontal axis,

said top rail means cooperatively receiving and supporting a section of substantially horizontally disposed pipe when deposited thereon;

means including a top rail fluid pressure operated cylinder extending between and operatively connected at its respective ends with the respective said stand means and top rail opposite its said pivotal connection for inclining the longitudinal axis of said top rail means with respect to the horizontal to induce a gravity actuated rolling action transversely of the work path on a section of pipe when deposited thereon;

arm means comprising an elongated arm disposed transversely of the work path and pivotally connected at one end portion with the pivotally connected end portion of the respective said top rail for vertical pivoting movement of its other end portion toward and away from the surface of the earth and for receiving a section of pipe from said top rails when deposited thereon and lowering and releasing the section of pipe adjacent the surface of the earth;

a lateral normally upwardly directed stop secured to said other end portion of each said arm for normally maintaining a section of pipe on said arms; and,

other fluid pressure operated cylinders interposed between and operatively connected with each said stand means and said arms, respectively.

4,051,957

CONTAINER LOADING SYSTEM

Eriks Parups, Bradenton, Fla., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 542,665, Jan. 21, 1975, abandoned. This application June 23, 1976, Ser. No. 698,863
Int. Cl.[2] B65G *57/14*; B65H *29/18*
U.S. Cl. 214—6 H **26 Claims**

1. A container loading system for transporting and loading articles into containers, said system comprising:

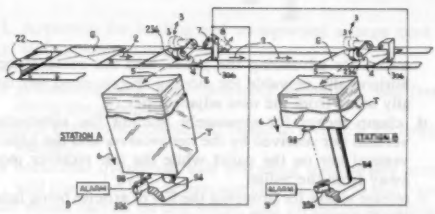
means defining a feed path for transporting articles in seriatim;

means for transporting said articles along said feed path;

a first removable loading container having an open top disposed adjacent and substantially perpendicular to said feed path for receiving said articles, said first container being oriented at an incline approaching the vertical with its open top facing the feed path, said first container having signal means for providing a full load signal when said first container is full;

a second removable loading container having an open top for receiving said articles, said second loading container disposed adjacent and substantially perpendicular to said feed path downstream from said first loading container, said second container being oriented at an incline approaching the vertical with its open top facing the feed path;

means defining a first loading station disposed along said feed path for receiving said transported articles and ejecting the articles to said first loading container, said first loading station comprising a first limiting means disposed along said feed path for stopping each article as it is received at said first loading station, and a first ejecting



means for ejecting each stopped article at said first loading station to said first container;

means defining a second loading station disposed along said feed path downstream of said first loading station for receiving transported articles and ejecting the articles to said second loading container when said articles are allowed to pass by said first loading station, said second loading station comprising a second limiting means disposed along said feed path for stopping each article as it is received at said second loading station, and a second ejecting means for ejecting each stopped article at said second loading station to said second loading container;

switching means operatively connected to said first limiting means and said signal means for disabling the first limiting means from stopping received articles in response to said full load signal, whereby the articles are allowed to pass by the first loading station and are transported to said second loading station when said first loading container is full; and

means for lowering each of said containers to sequentially receive articles that are ejected from said transporting means, said containers each being movable until full of said articles, whereby the signal means is activated to provide said signal.

4,051,958

PALLET UNLOADING AND ORIENTING DEVICE

Bruce E. Richardson; Gerald E. Wilson; Louis A. Leseelleur, and Rudy Oetliker, all of London, Canada, assignors to Labatt Breweries of Canada Limited, London, Canada

Filed Feb. 26, 1976, Ser. No. 661,757
Claims priority, application Canada, June 3, 1975, 228277
Int. Cl.[2] B65G *59/08*
U.S. Cl. 214—8.5 C **16 Claims**

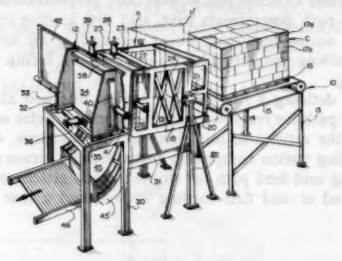
1. An apparatus for unloading and orienting articles stacked in tiers on a pallet comprising:

a. a tiltable pallet receiver having a pair of side frames, a

back wall and a bottom member, said receiver being supported on a support frame by means of pivotal mountings on said support frames, whereby it can in an upright position receive a loaded pallet with the bottom member substantially horizontal and then tilt until the pallet and tiered articles are resting on their sides on the receiver back wall forming a series of substantially vertical adjacent tiers;

b. means for intermittently advancing the tilted, loaded pallet in a primarily horizontal direction;

c. a single tier receiver for receiving a substantially vertical tier of articles during an intermittent advance of said



means for advancing the pallet, said tier receiver being horizontally movable for moving the received tier laterally away from the next adjacent tier;

d. clamp means for separately holding the substantially vertical tier received by the tier receiver and the adjacent vertical tier on the pallet while the tier receiver moves away from the pallet;

e. release means for dropping the tier of articles being held in the tier receiver; and

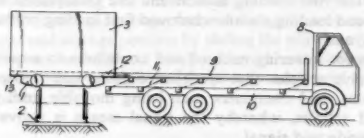
f. a delivery chute for receiving the dropped tier and delivering the articles in an upright position onto a horizontal table.

4,051,959

SYSTEM FOR HANDLING GOODS ON CARRIERS FOR COMBINED RAILWAY AND OVERLAND TRANSPORTATION

Finn Staff, Ski, Norway, and Christer Svensson, Laholm, Sweden, assignors to Linjegods A/S, Oslo, Norway and Lagaholm AB, Laholm, Sweden

Filed Mar. 24, 1976, Ser. No. 669,990
Claims priority, application Norway, Mar. 24, 1975, 751020
Int. Cl.² B65G *67/02*
U.S. Cl. 214—38 BA **5 Claims**



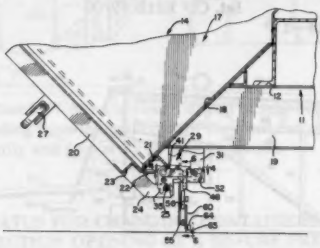
1. A system for handling goods on carriers for combined railway and overland transportation, comprising a truck having a carrying platform thereon that extends lengthwise of the truck, means to raise and lower the platform to adjust the platform to the height of a railway car, a sled that is movable lengthwise of the truck on guides on the carrying platform, means for moving the sled lengthwise along the platform to push or pull carriers along the platform lengthwise of the truck to or from a railway car, pegs on the sled that are movable transversely of the direction of movement of the sled along the platform, and means for moving said pegs transversely of the direction of movement of the sled along the platform thereby selectively to engage or withdraw said pegs from recesses or holes in the carriers to connect or disconnect the sled from the carriers.

4,051,960

LOCKING END ACTUATING MECHANISM FOR RAILWAY HOPPER CAR DOORS

William Raksanyi, Hammond, Ind., assignor to Pullman Incorporated, Chicago, Ill.

Filed Oct. 26, 1976, Ser. No. 735,239
Int. Cl.² B65G *67/24*
U.S. Cl. 214—63 **10 Claims**



1. A railway hopper car having a door hinged at its upper end to said car for outward swinging movement of its lower end to an open position and a keeper on said lower end if said door, the improvement of

a latch mechanism on said car adjacent said lower end comprising:

a bracket on said car,

a latch member having a keeper engaging portion in the closed position of said door extending vertically and blocking outward movement of said door,

means pivotally mounting said latch member above said keeper for clockwise and counterclockwise movement,

actuating linkage for said latch member including a first toggle link pivotally connected to said latch member,

a second toggle link including means pivotally connecting the same to said first toggle link,

means pivotally connecting said second toggle link to said bracket,

an unlocking lever including an upright arm, said lever being pivotally connected to the pivotal connecting means of said toggle links,

said lever including a second arm in the loading position blocking pivotal movement of said toggle links, and operating means exerting an upward thrust on said upright arm, thereby pivoting said second arm to an out-of-the-way position whereby said toggle links are pivoted, thereby swinging said latch member in a clockwise direction whereby said keeper is released from said keeper engaging portion to permit movement of said door to said open position.

4,051,961

AUTOMATIC TRASH PICKUP MACHINE

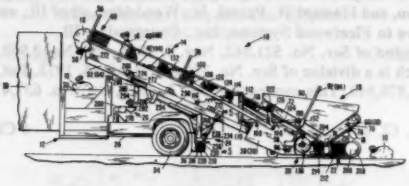
James P. Williams, Plainview, Tex., assignor to Williams Automatic Refuse Removal Corporation, Albuquerque, N. Mex.

Filed June 23, 1975, Ser. No. 589,638
Int. Cl.² B60P *1/36*
U.S. Cl. 214—83.14 **30 Claims**

13. In an automatic trash pickup apparatus including means for picking up articles of trash from a surface and plcing the trash on an inclined elevating conveyor for deposition in a storage portion of a vehicle on which the pickup apparatus is mounted, the improvement comprising:

a front elevating and turning bolster assembly for attaching

a forward end of the elevating conveyor to the vehicle, said bolster assembly including means for compensating



for compression of the vehicle's suspension as said pickup apparatus is swung laterally.

4,051,962

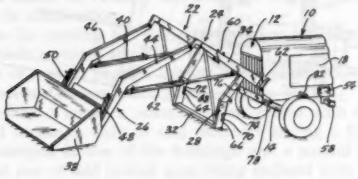
LOADER DEVICE FOR A TRACTOR

Neal W. Westendorf, Smithland, Iowa 51056

Filed Jan. 21, 1977, Ser. No. 761,322

Int. Cl.[2] E02F *3/62*

U.S. Cl. 214—131 A **2 Claims**



1. In combination,

a tractor having rearward and forward ends and opposite sides, a substantially horizontally disposed tubular member operatively secured to said tractor and extending laterally from each side of the tractor adjacent the forward end thereof,

connector means secured to said tractor at each side thereof rearwardly of the forward end thereof,

a loader device comprising a sub-frame means having spaced-apart and longitudinally extending side frame members having rearward and forward ends; a tower member operatively secured to each of said side frame members and extending upwardly therefrom; a boom means having rearward and forward ends and being pivotally secured at its rearward end to said tower members and being adapted to have a material handling implement connected to the forward end thereof; each of said side frame members having a forwardly extending slot formed therein having an open rearward end adapted to receive the laterally extending tubular members therein at times; said side frame members beng operatively connected to said connector means, a lock means pivotally secured to each of said side frame members and having first and second ends; each of said lock means being pivotally movable between first and second positions; said lock means, when in its first position, having one end thereof positioned rearwardly of the tubular member received in said slot so as to maintain said side frame member on said tubular member; each of said lock means being pivotally movable to said second position wherein the other end of said lock means is in communication with said slot spaced rearwardly from said tubular member so that said tubular member may move rearwardly in said slot to enable the loader device to be removed from the tractor and wherein the said rearward movement of said tubular member will cause said lock means to pivotally move from its said second position to its said first position for facilitating subsequent re-mounting of the loader on the tractor.

4,051,963

COMBINED HAY CARRIER AND FEEDER

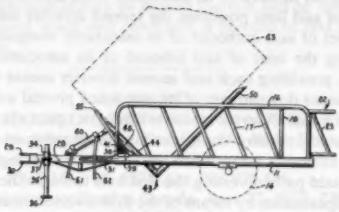
William G. Coon, Jr., Box 196, Spickard, Mo. 64679

Division of Ser. No. 524,042, Nov. 15, 1974, Pat. No. 3,949,706.

This application Jan. 23, 1976, Ser. No. 651,963

Int. Cl.[2] A01K *5/00*

U.S. Cl. 214—144 **1 Claim**



1. Apparatus for loading and transporting a large mass of hay, said apparatus comprising:

a frame;

a ground-engaging wheel assembly supporting said frame above the ground;

means adapted to couple said frame to a vehicle for towing thereby;

a horizontal cylindrical axle extending transversely across said frame and having opposite ends secured to said frame;

lift means carried on said frame, said lift means including a pair of tubular sleeves telescopingly received on said horizontal axle, a pair of support members having top and bottom ends and being secured to said tubular sleeves intermediately of said top and bottom ends, and a pair of hay-engaging forks secured to the bottom ends of said support members and extending generally rearwardly thereof; and

an extendable and retractable power cylinder connected to the top ends of said support members and connected to said frame for pivotally moving said lift means about said horizontal axle to thereby raise said hay mass from the ground to an elevated position upon retraction of said power cylinder and to lower said hay mass to the ground from the elevated position upon extension of said power cylinder.

4,051,964

DEVICES FOR COLLECTING BALES OF STRAW OR OTHER MATERIALS

Jan Gerrit Meijer, Lellens, Netherlands, assignor to Thomas Hauke Daniel Meijer, Lellens, Netherlands

Continuation of Ser. No. 462,943, April 22, 1974, abandoned.

This application Nov. 17, 1975, Ser. No. 632,628

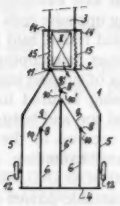
Claims priority, application Netherlands, Apr. 20, 1973, 7305658

Int. Cl.[2] A01D *87/12;* **B65G** *57/32*

U.S. Cl. 214—152 **3 Claims**

1. A process for collecting bales into a group, said process comprising: forming a bale feed path having a downwardly inclined portion and a substantially horizontal portion downstream of said inclined portion; forming two groups of two parallel collecting compartments on the horizontal portion of the feed path, said compartments lying in a common horizontal plane, each group of compartments being located at a respective side of a central longitudinal partition and each compartment having an inlet at one end portion; providing first bale diverter means on the inclined portion of the feed path, said first diverter means being pivotal about an axis between two

limit positions to divert bales to a respective one of said groups of compartments in each of the limit positions, and providing said first diverter with resilient flexible extension means downstream of said axis; providing second bale diverter means for each pair of compartments of the respective groups, said second diverter means being located on the horizontal portion of the feed path between the first diverter means and the inlet of the compartment, each said second diverter means being pivotal about an axis between two limit positions, in one of said limit positions the second diverter means opening the inlet of the outboard of its associated compartments and closing the inlet of the inboard of its associated compartments, and in the other of said limit positions, the second diverter means closing the inlet of said outboard of its associated compartments and opening the inlet of said inboard of its associated compartments, providing each said second diverter means with extension means downstream of its associated pivotal axis and biasing each said diverter means whereby it opens the inlet of its associated outboard compartment except when its correspondingg extension means bears against a bale; feeding a first bale along said path; diverting the first bale towards the first group of compartments by means of the first diverter means, said first bale pivoting the first diverter means from one of its limit positions into the other limit position as said first bale engages



the flexible extension means of the first diverter means; feeding a second bale along the path; diverting the second bale towards the second group of compartments by means of the first diverter means, said second bale pivoting the first diverter means from its said other limit position into its said one limit position as the second bale engages the flexible extension means of the first diverter means; feeding further bales along the feed path such that successive bales are diverted alternately to the first and second groups of compartments by the first diverter means and each bale pivots the first diverter means into its opposite limit position as the bale engages the flexible extension means of the first diverter means; distributing the bales diverted by the first diverter means between the respective compartments of the corresponding group, said bales being distributed between the compartments by said biased diverter means such that said outboard compartments are first filled with a plurality of bales and then said inboard compartments are filled with a plurality of bales, said bales entering said outboard compartments pivoting each said biased diverter means by engaging its extension means and the last said bale of said plurality of bales received in each compartment maintaining said biased diverter means in position for filling the adjacent inboard compartment; and withdrawing the group of bales thus formed from the compartments.

4,051,965

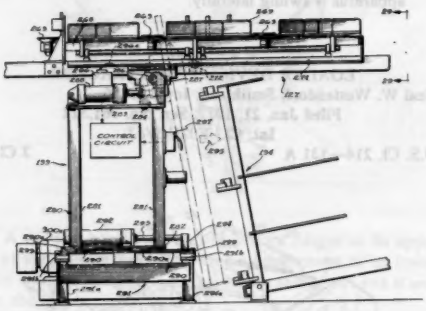
FILLED BUG HANDLING AND STORAGE APPARATUS

Wallace W. Mojden, Hinsdale; Jose E. Davila, Chicago; George W. Hooper, Western Springs; Gerald M. Kwiatkowski, Dolton, and Howard W. Pantel, Jr., Woodridge, all of Ill., assignors to Fleetwood Systems, Inc., Countryside, Ill.

Division of Ser. No. 521,842, Nov. 7, 1974, Pat. No. 3,962,845, which is a division of Ser. No. 351,639, April 16, 1973, Pat. No. 3,878,949. This application Dec. 3, 1975, Ser. No. 637,470

Int. Cl.[2] B65G *1/06*

U.S. Cl. 214—16.4 A **4 Claims**



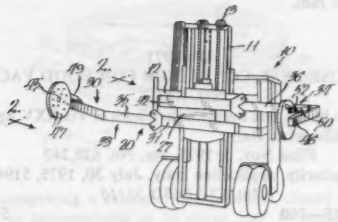
1. In combination, bag storage means including at least one storage bay, and bag handling apparatus for receiving filled bag elements at a packaging station, or the like, and automatically delivering and depositing said bag in said storage bay, said bag handling apparatus, comprising, stationary guide means extending from said packaging station in a first direction, a carriage assembly movable along said guide means both toward and away from said packaging station, and first drive means operably associated with said carriage assembly for effecting said movement, said carriage assembly comprising a lower frame unit engaged upon said stationary guide means and movable therealong upon operation of said first drive means, and a upper frame unit supported on said lower frame unit for relative movement in a second direction, generally transverse to the direction of movement of said lower frame unit along said guide means, and a second drive means for effecting movement of said upper frame unit relative to said lower frame unit in said second direction, a trough member pivotally mounted to said upper frame unit for movement between a generally horizontal position for receiving a filled bag from said packaging station, and a generally vertical position for depositing filled bags in said storage bay, said storage bay including at least one bay having a open end, filled bag engaging means mounted adjacent said end, said storage bay being disposed adjacent to, but, spaced from said guide means and being elongate in said second directions, such that upon disposition of a filled bag in said trough, said first drive means can be operated to move said carriage assembly along said guide means into alignment with the open end of said storage bay, and thereafter said second drive means can be operated to move said upper frame unit relative to said lower frame unit in said second direction to dispose said trough and an associated filled bag interiorly of the open end of said storage bay, such that upon operation of said second drive means to withdraw said trough from said storage bay, said filled bag engaging means will maintain said bag within said storage bay.

4,051,966

TIRE MANIPULATING APPARATUS

Larry G. Cotton, Clear Lake, Iowa, assignor to Iowa Mold Tooling Co., Inc., Garner, Iowa

Filed Oct. 23, 1975, Ser. No. 625,114
Int. Cl.[2] B66C 3/16
U.S. Cl. 214—332 7 Claims



1. In a tire manipulating apparatus which includes a mounting member, means supporting said mounting member on a vehicle mounted structure for raising and lowering the mounting member, an axially rotatable head on the mounting member, and means for rotating said head, the improvement comprising, in combination:

means for moving the mounting member laterally on the vehicle mounted structure;

a pair of spaced, parallel, tubular housings on the rotatable head, said housings being in a common plane;

an L-shaped member operatively associated with each of said housings, each of said members having a first arm telescoped in one of the housings, and a second arm, at least one of said second arms being inclined with respect to said first arms so that the free ends of the second arms are coaxial;

opposed tire gripping elements at the free ends of the L-shaped members;

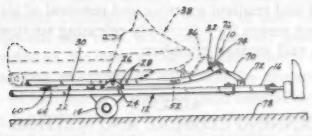
and power operated means for coordinately extending and retracting said L-shaped members so that the tire gripping elements may grippingly engage diametrically opposite areas of the tread surface of a tire the diameter of which is in a plane parallel to said tubular housings and normal to said common plane.

4,051,967

SNOWMOBILE TRAILER

Jarvis D. Sedgwick, 501 Fourth Ave., and Gordon C. Headlee, R.R. 1, both of Coon Rapids, Iowa 50058

Filed Aug. 12, 1976, Ser. No. 713,632
Int. Cl.[2] B60P 1/28
U.S. Cl. 214—505 8 Claims



1. A snowmobile trailer comprising,

a trailer frame having front and rear ends and being U-shaped and open at its rear end,

ground engaging wheels on said frame for supporting said trailer frame above the ground,

a U-shaped sub-frame open at its rear end pivotally connected along its side members to adjacent side members of said trailer frame for pivotal movement between raised and lowered positions with said forward end being up in said raised position and said forward end being down in said lowered position,

said trailer frame and sub-frame being substantially open along their length between their side members,

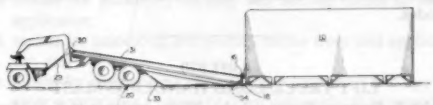
fastening means front and rear on said sub-frame for securing a snowmobile to said sub-frame, said front fastening means including a support portion at the front end of said sub-frame which engages the ground when said sub-frame is pivoted to said lowered position whereby the front end of said snowmobile may be moved thereon and be lifted off the ground when said sub-frame is pivoted to said raised position.

4,051,968

LOAD HANDLING METHOD AND APPARATUS

Navarre Andre Massey, P.O. Box 850, 542 River Drive, Fort MacLeod, Alberta, Canada (T0L 0Z0)

Filed Mar. 29, 1976, Ser. No. 671,416
Claims priority, application Canada, June 27, 1975, 230360
Int. Cl.[2] B60P 1/14
U.S. Cl. 214—506 15 Claims



1. In a flat bed trailer tiltably attachable to a hauling unit, comprising a flat bed platform provided, on its lower surface, with at least two longitudinal carriage guiderails, a movable wheel carriage assembly provided with rollers which engage the said carriage guiderails, the improvement which comprises: (1) a winch; (2) a winch cable engaged by the said winch and capable of being selectively connected to the forward lower edge of a load or to the forward part of the said wheel carriage assembly; (3) a linkage cable, one end of which is capable of being connected to the forward lower edge of the load, while the other end is capable of being connected to the rear part of the said wheel carriage assembly; (4) an idler sheave located at the rear of the said flat bed trailer, adapted to accept and guide said linkage cable.

13. A method of loading of a load onto a tiltable flat bed trailer provided with a wheel carriage assembly which is mounted for sliding movement relative to the bed in the direction of travel of the trailer, and a single power means connectable to said wheel carriage assembly and said load, said method consisting of operating said power means drawing the said load forward and onto said trailer when it is tilted downwardly at the rear and, simultaneously, drawing said wheel carriage assembly rearward thus returning the said trailer to a horizontal position.

4,051,969

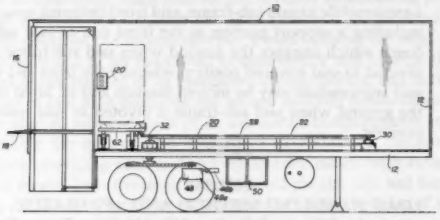
BULK DISTRIBUTION SYSTEM

George Homanick, Lathrup Village, Mich., assignor to PepsiCo Inc., Purchase, N.Y.

Filed Mar. 15, 1976, Ser. No. 667,156
Int. Cl.[2] B60P 1/64
U.S. Cl. 214—516 16 Claims

1. A load conveyor arrangement for the storage and conveyance of load-carrying roller carts in a loading vehicle having a loading platform, comprising: endless conveyor means having a pair of conveyor runs extending along the longitudinal length of said platform; a plurality of roller cart-supporting carriers being fastened to said endless conveyor means in predetermined spaced relationship along the length thereof, each of

said carriers being adapted to respectively support one of said roller carts, each said carrier comprising a pair of parrallel spaced U-rails extending normally from said endless conveyor means above said loading platform, said U-rails being downwardly inclined towards said endless conveyor means, and at least one crossbeam interconnecting said U-rails so as to form a rigid bracket structure, said load-carrying roller carts each



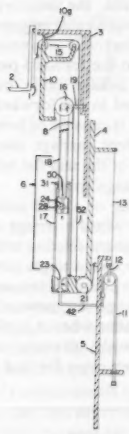
having casters mounted thereon adapted to be supported on said U-rails; drive means operatively engaging said endless conveyor means for moving said conveyor runs and said carriers along said platform; and means for controlling the extent of movement of said endless carrier means and of said carriers for selectively positioning said carriers on said loading platform in either roller cart loading and unloading or transportation modes.

4,051,970

LIFT TRUCK LOAD HANDLING MAST

Keith E. Ramsey, Pleasant Lake, Mich., assignor to K-D Manufacturing Company, Waco, Tex.

Filed Nov. 7, 1975, Ser. No. 630,039
Int. Cl.[2] B66F *9/06, 9/08*
U.S. Cl. 214—670 **16 Claims**



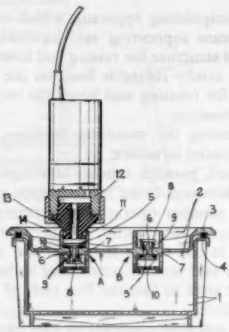
1. An extensible load handling mast for a lift truck comprising: a plurality of telescopic sections operably interconnected to extend and collapse including a first vertically fixed outer section, a second vertically movable center section, and a third vertically movable section; a load handling carriage movably mounted on a carrier assembly vertically movable along said third mast section, said third section comprising the top section of said mast when said mast is fully extended; a hydraulic ram comprising a single stage unit having a cylinder and one extendable piston rod operable in said cylinder, said ram being supported on said second mast section for vertical movement within said mast sections; and flexible line means movably supporting said carriage from said carrier at all positions of said carriage along said mast from a lowest position of said carriage at full retraction of said mast to a maximum height position of said carriage at full extension of said mast and said flexible line means operably interconnecting said mast sections and said carrier and carriage to produce a four-to-one ratio in the raising and lowering of said carriage relative to said extendible piston rod for extending and collapsing said mast and raising and lowering said carriage along said mast responsive to operation of said ram.

4,051,971

HOME USE SEAL CONTAINER FOR FOOD VACUUM STORAGE

Piergiorgio Saleri, and Sergio Saleri, both of Via XXV Aprile 14, Rovato (Brescia), Italy

Filed Nov. 3, 1975, Ser. No. 628,242
Claims priority, application Italy, July 30, 1975, 5194/75
Int. Cl.[2] B65D *51/16*
U.S. Cl. 215—260 **5 Claims**



1. Home use seal container apparatus for food vacuum storage, comprising as main structural elements a vessel and a lid superimposable on said vessel to form a storage chamber, a resilient gasket between said vessel and lid, an air seal valve secured with one of said structural elements, said valve comprising a housing integral with said one structural element and including a union projecting therefrom in a direction away from the other structural element, a flat shutter normally held in a closed position against an associated seating, a stem secured to said shutter, said stem extending with clearance through an aperture provided in said one structural element, a cap on said stem, a resilient member acting on said cap to urge the shutter to said closed position, and a suction pump comprising a casing of resilient material including an annular edge portion, said edge portion being dimensioned for insertion into said union to a given depth therein to form a sealed relation of said casing with said housing such that suction pressure developed by said pump will produce lifting of said shutter against the action of said resilient member and removal of air from the container, and means for selectively releasing suction pressure from within said storage chamber.

4,051,972

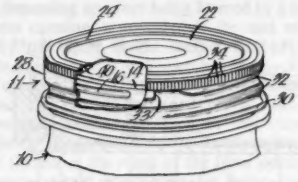
CANNING CLOSURE AND METHOD

Albert L. Botkin, 3018 Hood Ave., Chicago, Ill. 60659

Continuation-in-part of Ser. No. 572,160, April 28, 1975, Pat. No. 3,967,746. This application June 1, 1976, Ser. No. 691,564
Int. Cl.[2] B65D *51/16*
U.S. Cl. 215—260 **21 Claims**

1. A sealed package under vacuum comprising a container having a body portion and an upwardly-extending neck portion which terminates in an upper circumferential sealing lip and defines a mouth; helical container thread means on the outer surface of said neck portion; and a one-piece reusable

closure threadedly engaging said neck portion and sealingly secured to said container; said closure comprising a central cover section having an inner surface and an outer surface and terminating outwardly in a depending peripheral skirt having a helical skirt thread means complementary to and in threaded engagement with said container thread means, an annular



gasket comprising a resilient, compressible closed cell foam resilient at temperatures up to about 250° F. bonded to the inner surface of said closure adjacent to said skirt and being in sealing engagement with, and compressed against, said lip around the entire periphery of said lip, and limitor means displaced from said gasket for limiting the compression of said gasket material against said lip to a predetermined degree.

4,051,973

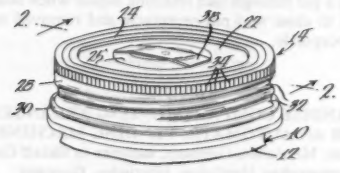
CANNING CLOSURE AND METHOD

Albert L. Botkin, 3018 Hood Ave., Chicago, Ill. 60659

Continuation-in-part of Ser. No. 572,160, April 28, 1975, Pat. No. 3,967,746. This application June 1, 1976, Ser. No. 691,310

Int. Cl.² B65D *51/16*

U.S. Cl. 215—260 **15 Claims**



1. A sealed package under vacuum comprising a container having a body portion and an upwardly-extending neck portion which terminates in an upper circumferential sealing lip and defines a mouth; helical container thread means on the outer surface of said neck portion; and a one-piece reusable closure threadedly engaging said neck portion and sealingly secured to said container; said closure comprising a central cover section having an inner surface and an outer surface and terminating outwardly in a depending peripheral skirt having a helical skirt thread means complementary to and in threaded engagement with said container thread means, a downwardly opening annular channel being defined in said central cover section adjacent said skirt, a resilient annular gasket disposed in, and bonded to, the inner surface of said annular channel and being in sealing engagement with said lip around the entire periphery of said lip, a portion of said central cover section presenting a substantially flat exterior surface defining an orifice and having a self-biased resilient member secured to said central cover section for disengageably overlying said orifice and normally sealing said orifice but venting said package when the pressure within said container exceeds atmospheric, a portion of said closure central cover section being inwardly dished and being maintained in that inwardly dished configuration when pressure within the sealed package is subatmospheric, said inwardly-dished portion being capable of springing preferentially to an outwardly dished configuration when the pressure within the sealed package is at least atmospheric.

4,051,974

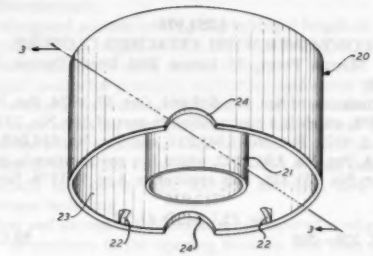
SEALING APPARATUS

Charles J. Gentile, North Caldwell, N.J., assignor to Orange Products, Inc., Chatham, N.J.

Filed Feb. 18, 1976, Ser. No. 658,862

Int. Cl.² B65D *41/04*

U.S. Cl. 215—329 **4 Claims**



1. An improved sealing apparatus for an applicator of the type having a means for sealing an exposed surface of an applicator from the environment, said sealing means comprising or included within a cap, wherein the improvement comprises:

a. means for positively locking said sealing means to said applicator;

b. means for unlocking said sealing means from said applicator; and

c. means for disengaging said sealing means from said applicator comprising a plurality of arcuate surfaces concavely set in an interior wall of said cap and a plurality of cam surfaces extending upwardly from said applicator, such that said arcuate surfaces are in registration with said cam surfaces when said cap and applicator are in sealed position.

4,051,975

CAP FOR FUEL TANK

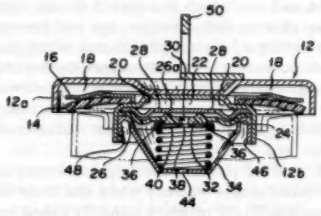
Hidetoshi Ohgida; Yoshiharu Sakai, both of Atsugi, and Hiroyuki Kawai, Tokyo, all of Japan, assignors to Nihon Radiator Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1977, Ser. No. 778,849

Claims priority, application Japan, Mar. 25, 1976, 51-35186[U]

Int. Cl.² B65D *51/16*

U.S. Cl. 220—203 **8 Claims**



1. A cap of a fuel tank comprising a lid member constructed of upper and lower plates to form a passage communicated with the air between both plates, a seating plate underlying said lid member and provided with a plurality of bores circularly arranged in the peripheral portion of the central flat field thereof, a diaphragm of a flexible material underlying said seating plate and provided with a perforation in the central portion thereof and an annular ridge surrounding the perforation on the upside thereof, a valve plate underlying said diaphragm and provided with a perforation in register with the perforation of said diaphragm, a casing disposed at the lowest

position in the cap and provided with a perforation in the bottom thereof, the peripheral portion of said diaphragm being fixedly interposed between the peripheral portion of said lower plate with intermediation of said seating plate and the flange portion of said casing, and a coil spring held in said casing and adapted to urge said valve plate upwardly.

4,051,976

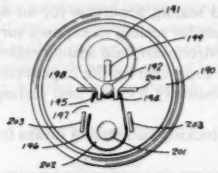
CONTAINER WITH ATTACHED CLOSURE

Walter Merton Perry, 76 Locust Hill Road, Darien, Conn. 06820

Continuation of Ser. No. 515,444, Oct. 17, 1974, Pat. No. 3,977,578, which is a continuation-in-part of Ser. No. 231,124, March 2, 1972, Pat. No. 3,843,011, and Ser. No. 514,069, Oct. 11, 1974, Pat. No. 3,952,912, which is a continuation-in-part of said Ser. No. 231,124. This application Aug. 9, 1976, Ser. No. 712,839

Int. Cl.[2] B65D *41/32*

U.S. Cl. 220—269 **50 Claims**



1. An improved easy open container having a top made of sheet material and having easy opening means therein, and in which said easy opening means comprises,

an openable segment in said container top and with said segment defined by a weakening score line which extends almost all the way around the periphery of said segment but with said score line interrupted at one point and thereby leaving a relatively short unscored section along said periphery, and which unscored section forms a permanent hingeable attachment means to anchor said openable segment to said container top after opening of said segment,

an elongated leverage lift tab means for manaul leverage opening of said openable segment, and with said leverage lift tab means hingeably attached at a point along its length to rivet securement means, and with said rivet securement means permanently secured to said container top at a position on said top which is outward of said openable segment but close to said score line, and said leverage lift tab means having a longer outer lift end which overlies and extends outward over said container top beyond said openable segment, and having a shorter inner downward pressure exerting end means which extends partially over said openable segment in the region near said rivet securement means, and

said inner downward pressure exerting end means having pressure contact means whereby when said outer lift end of said leverage lift tab means is manually raised upward to open said openable segment, said inner downward pressure exerting end means will move downward and cause said pressure contact means to exert high downward pressure against said openable segment in the region near said rivet securement means, and will cause rupture along said score line, and whereby said pressure contact means will cause downward bending of said openable segment into said container, and provide an opened area in said container top, and wherein said segment remains attached to said container top by at least said unscored section hingeable attachment means.

4,051,977

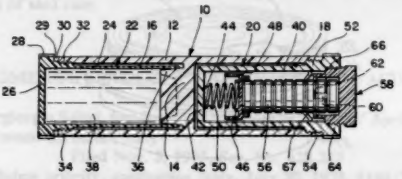
PILL AND WATER DISPENSER

Carolyn VeAlletto Steinfeld, New York, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 14, 1976, Ser. No. 677,048

Int. Cl.[2] G07F *11/14*

U.S. Cl. 221—96 **7 Claims**



1. A dispenser for holding and dispensing pills and water comprising tube means, the ends of said tube being open, bulkhead means in said tube for dividing said tube into a water chamber and a pill chamber, openable and closable pill dispensing means received by said pill chamber, water dispensing means received by said water chamber, the bottom of said water dispensing means comprising a cap for said water chamber whereby said water chamber and water dispenser is sealed when said water dispenser is received by said water chamber, said pill dispensing means comprising a pill receptacle having bottom wall means and side wall means, resilient means in said pill dispensing means for biasing pills upwardly from said bottom wall, retaining means at the top of said side walls for preventing pills in said pill receptacle from being biased out of said pill receptacle, cap means for sealing the top of said pill receptacle, clip means extending from said cap into said pill receptacle for gripping a pill through said retaining means and for pulling a pill through said retaining means when said cap is positioned to close said pill receptacle and removed to open said pill receptacle.

4,051,978

MERCHANDISE COMPARTMENTING ARRANGEMENT FOR AN AUTOMATIC VENDING MACHINE

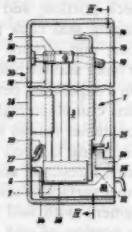
Josef Kiefer, Herrieden, Germany, assignor to Sielaff GmbH & Co. Automatenbau Herrieden, Herrieden, Germany

Filed Jan. 13, 1976, Ser. No. 648,803

Claims priority, application Germany, Jan. 23, 1975, 2502626

Int. Cl.[2] B65H *1/00*

U.S. Cl. 221—197 **10 Claims**



1. In a merchandise compartmenting arrangement for an automatic vending machine of merchandise packages; including actuating means operatively associated with merchandise compartments for dispensing the merchandise packages; at least one of said merchandise compartments being constructed as an independent self-supporting unit which is fillable with merchandise packages externally and separately from said vending machine, and is separately transportable with regard to the latter and insertable therein for filling of the vending machine with merchandise packages; means for receiving said

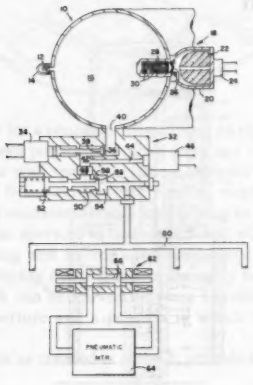
unit in said machine in an operative position for the dispensing of packages by operation of said actuating means, said unit having a dispensing aperture through which the merchandise packages are dispensable singly responsive to operation of said actuating means when the unit is in said operative position within said vending machine, the improvement wherein said unit has a front opening extending substantially the entire height of the unit for filling the unit with merchandise packages, said dispensing aperture being formed by a lower portion of said front opening, a cover plate for said unit extending substantially the entire height thereof and having an open position for filling the unit with merchandise packages through said front opening, and a closed position to enclose the packages in said unit during transport thereof, said cover plate covering said dispensing aperture in said closed position, means slidably supporting said cover plate for longitudinal movement thereof in the plane of the front opening, and projecting means on said cover plate for being operatively engaged when the unit is inserted into the machine to effect longitudinal upwards displacement of the cover plate relative to the unit to expose said dispensing aperture.

4,051,979

PNEUMATIC SERVO SYSTEM UTILIZING HEAT SQUIB AND EXPLOSIVE VALVE

James M. Smith, Fanibel Island, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 12, 1976, Ser. No. 685,552
Int. Cl.² B01J *7/00*
U.S. Cl. 222—3 **5 Claims**



1. A pneumatic servo system comprising a container filled with inert gas, a heat squib mounted on the side of said container for heating the inert gas and increasing the pressure thereof when the heat squib has been ignited, an outlet from said container, control means connected to said outlet from said container a pressure regulator having an inlet, said control means including a piston actuated explosive valve interconnecting the outlet from said container to said inlet of said pressure regulator, a manifold outlet, and said pressure regulator being connected to said manifold outlet for delivering said inert gas to said manifold outlet at a predetermined pressure.

4,051,980

GRANULAR MATERIAL DISTRIBUTOR

Leroy Vydrzal, Rte. 1, Box 243, Smithville, Tex. 78957

Filed May 20, 1976, Ser. No. 688,148
Int. Cl.² B62D *33/00*
U.S. Cl. 222—610 **4 Claims**

1. A material dispenser for selectively dispensing granular material from a dump truck of the type having a tiltable body portion with an open end and a tailgate pivotable about an axis near the top of said open end, said dispenser comprising the combination of

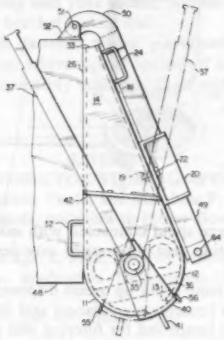
an elongated upwardly opening, substantially semicylindrical trough having a central axis, said trough having a length greater than the width of said tiltable body portion;

means in the lower portion of said trough defining a longitudinally extending slot dimensioned for permitting passage of granular material of a predetermined average size therethrough;

an elongated arcuate cover plate having a length at least as great as the length of said slot and having a curvature substantially the same as said trough;

hanger means for rotatably supporting said cover plate for concentric movement relative to and outside of said trough about an axis parallel with said central axis between a first position in which said cover plate lies immediately below and closes said slot and a second position in which said cover plate exposes said slot, said hanger means including

first and second end plates having a tapered configuration to conform to the opening between said body portion



and said partially open tailgate, said end plates being fixedly attached to opposite ends of said trough and having arcuate lower edges conforming to the shape of said trough,

first and second hanger plates attached to opposite ends of said cover plate and extending parallel with said end plates, and

axle means for rotatably supporting said hanger plates on said end plates;

lever means attached to one of said hanger plates for manually moving said cover plate; and

means for supporting said trough and said hanger means between the open end of said truck body portion and said tailgate with said tailgate in a partially opened position and with the upper portion of said trough at or below the level of the floor of said body portion, said means including

first and second wall portions extending upwardly from said trough and inwardly from edges of said end plates toward and beyond the sides of said tailgate, and

clamp means on each of said wall portions for engaging and gripping said sides of said tailgate.

4,051,981

POWDER GUN

Louis John Mandlak, 116 Athenia Drive, Fort Worth, Tex. 76114

Filed Dec. 15, 1975, Ser. No. 640,621
Int. Cl.² B05B *7/14, 11/04*
U.S. Cl. 222—189 **2 Claims**

1. A powder gun adapted for dispensing a powder regardless of lumps that may tend to form therein comprising:

a. a hollow collapsible body that is normally biased to an

extended position and movable to a compressed position for discharging air and any powder therewithin from said body through an aperture and a dispensing member; said hollow collapsible body including:

i. a first aperture at one end; and

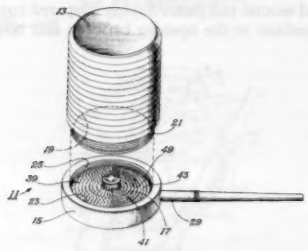
ii. a first connection means portion for connecting said hollow collapsible body to a dispensing member;

b. a dispensing member having:

i. a second aperture adapted to mate with said first aperture of said hollow collapsible body;

ii. a second connection means portion for matingly connecting to said first connection means portion for connecting said hollow collapsible body to said dispensing member, said second connection means portion being disposed adjacent said second aperture;

iii. a discharge port disposed in said dispensing member and penetrating through a wall thereof for discharging powder therethrough; and



iv. a discharge spout connected with said discharge port for directing said discharged powder into a desired area; and

c. a filter and lump break-up means disposed in said dispensing member immediately adjacent said discharge port for breaking up lumps and for filtering said powder and preventing entry of particles large enough to plug said discharge spout; said filter and lump break-up means comprising a rotatable disc rotatably mounted in said discharge member and having at least two sections of upstanding stalks disposed at a predetermined angle with respect to said disc; said stalks being of respective predetermined diameters and disposed at respective predetermined distances apart in the respective sections to achieve the desired filtering action and being sized and shaped to achieve the desired break up of any lumps that tend to form.

4,051,982

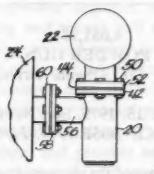
FAST RELEASE AERATOR FOR MATERIALS HANDLING

Harold M. Stetson, Neponset, Ill., assignor to Martin Engineering Company, Neponset, Ill.

Continuation-in-part of Ser. No. 502,547, Sept. 9, 1974, abandoned. This application Sept. 29, 1976, Ser. No. 727,397

Int. Cl.[2] G05D *3/14*; B67B *7/24*

U.S. Cl. 222—195 **2 Claims**



1. A quick release aeration system including a pressure source; a gravity discharge container for flowable materials; an aerator including a hollow body having an inlet port at one end connected to said pressure source, a charge port at said other end, a tapered seating surface defined by said body internal thereto adjacent said charge port and a side discharge port disposed between said inlet port and said charge port and connected to said gravity discharge container, a unitary piston slidably disposed in said hollow body said piston defining a passage therethrough and said piston defining a tapered seating surface on one end threof adapted to mate with said tapered seating surface of said hollow body; an air reservoir connected to said charge port for storing air at increasing pressures; valve means associated with said pressure source and said inlet port and adapted in one position to pressurize said inlet port and in another position to release pressure from said inlet port, whereby when said inlet port is pressurized said piston assumes a first position blocking communication between said side discharge port and said charge port and allowing air to pass from said inlet port through said passage in said piston to said reservoir and when said inlet port is depressurized said piston instantaneously moves to a second position allowing communication between said charge port and said side discharge port to allow a rush of pressurized air from said reservoir through said side discharge port to said container of flowable material.

4,051,983

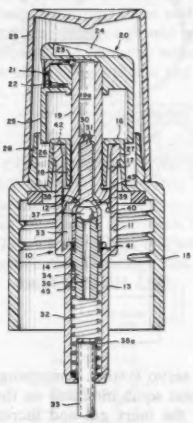
PUMP SPRAYER

Walter F. Anderson, West Covina, Calif., assignor to Diamond International Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,315

Int. Cl.[2] B05B *1/00*

U.S. Cl. 222—321 **7 Claims**



1. In a pump sprayer of the class which includes a pair of relatively aligned upper and lower pistons of large and small diameter respectively working in different diameter portions of a common pump chamber which has its lower end adapted for direct and open communication with a supply of liquid to be dispensed from a container through a dip tube connected to said lower end;

both of said pistons having valve controlled flow passages therethrough to permit only the upward flow of fluid through said pump chamber;

and means for reciprocating said pistons substantially in phase with each other for varying the volume of the pump chamber encompassed between said pistons;

the improvement wherein said small diameter piston is resiliently radially deformable and is normally in sealing relation with the inner wall of said pump chamber throughout its entire circumference;

said inner wall being formed with a protuberance located for

engagement with said small diameter piston at a predetermined axial location near the end of the downward stroke of said small diameter piston to locally inwardly deform a portion of the periphery of said piston so that entrapped air may escape from between said pistons into said lower end of the pump chamber and into said container through said dip tube to be replaced by liquid from said container.

4,051,984

COVER FOR A CONTAINER

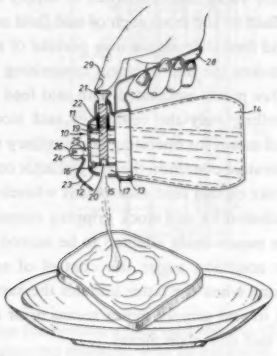
Hoi Ho, Kowloon, Hong Kong, assignor to Marigold Enterprises Ltd., Kowloon, Hong Kong

Filed Oct. 14, 1976, Ser. No. 732,387

Claims priority, application United Kingdom, Oct. 14, 1975, 42040/75

Int. Cl.² B65D *23/06*

U.S. Cl. 222—471 **13 Claims**



1. A closure for a container, comprising an end wall portion, a peripheral wall portion extending from one side of said end wall portion, a wall spaced from said peripheral wall portion and extending from said end wall portion, means for attaching the cover to a container, a pouring opening in said peripheral wall portion, an aperture in said spaced wall aligned with said pouring opening and having a cross-sectional area less than that of said pouring opening, and a manually movable closure member which can be moved between a position in which it closes said aperture and a position in which the aperture is open.

11. A closure as claimed in claim **1**, provided with a handle.

4,051,985

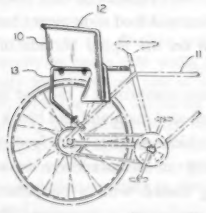
QUICK RELEASE CHILD'S BICYCLE SEAT

Irvin E. Berger, 4215 Grove, Skokie, Ill. 60076

Filed Dec. 1, 1975, Ser. No. 636,622

Int. Cl.² B62J *1/28*

U.S. Cl. 224—32 A **3 Claims**



1. In combination with a rear carrier adapted to carry a child on a bicycle having a seat tube assembly and at least one strut member, said rear carrier being attached to tubular frame means having two ends, the improvement comprising:

seat bracket means including a hook means and being pivotally adjustably attachable to said seat tube assembly;

strut bracket means,

said strut bracket means being selectively positionable along said strut member;

yoke means including a yoke pin, formed at one end of said tubular frame means,

said yoke means further including latch plate means pivotally mounted to said yoke pin;

hand-tightenable yoke tensioning means,

said tensioning means positioned at said yoke means opposite said yoke pin,

said tensioning means adapted to hook to said seat bracket means;

said latch plate means having slots formed therein to register with said tensioning means when said tensioning means is hooked to said seat bracket means and said latch plate means is pivoted thereupon,

said tensioning means, when tightened, thereby compressibly maintaining said yoke means, said latch plate means, and said seat bracket means; and

hand-tightenable fastener means positioned at said strut bracket means, whereby said second of said frame ends may be compressibly maintained at said strut bracket means.

4,051,986

PHOTOCONDUCTOR STORING APPARATUS

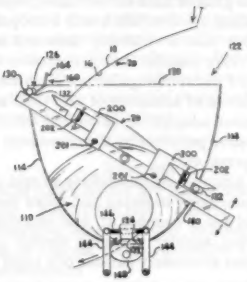
Hubertus H. Tiggelers, Venlo, and Martinus P. Chlôd, Velden, both of Netherlands, assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Apr. 2, 1976, Ser. No. 673,006

Claims priority, application Netherlands, June 6, 1975, 7506724

Int. Cl.² B65H *17/42*

U.S. Cl. 226—114 **9 Claims**



1. In a receptacle for a stack of zig-zag folded photoconductive web material having an imaging plane, conveying means for removing the web under traction via an outlet opening from the receptacle and for supplying the web material to an inlet opening of the receptacle, the receptacle having opposite guide walls arranged such that the stack is guided through the receptacle so as to cause the portions situated in closer proximity to the outlet opening than the inlet opening to form an arc which is concave-side oriented toward the outlet opening, whereby the stack is bowed, opposed tamping assemblies respectively movably mounted on opposite guide walls for contacting the folds of said web portions of the stack, and driving means for reciprocating the respective tamping assemblies along the guide walls, the improvement comprising: means for intermittently interconnecting the driving means and tamping assemblies, said interconnecting means including means for

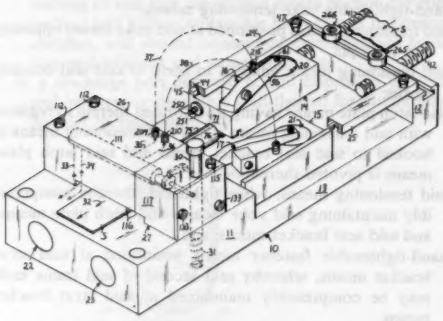
resiliently urging the tamping assemblies into sliding engagement with the guide walls.

4,051,987

HIGH SPEED STOCK FEEDER FOR PUNCH PRESSES AND THE LIKE

Albert W. Scribner, 6 Country Club Road, Darien, Conn. 06820

Filed Apr. 22, 1976, Ser. No. 679,438
Int. Cl.[2] B65H *17/36, 17/44*
U.S. Cl. 226—115 **30 Claims**



1. A pneumatically operated duplex stock feeder for intermittently advancing stock into the work station of a punch press or the like having a reciprocating ram: comprising

a main frame;

a pair of alternately acting feed slides reciprocally carried by said main frame;

main fluid motor means carried by said frame for actuating said feed slides;

stock gripping means mounted on each of said feed slides;

gripper fluid motor means carried by said feed slides for actuating said stock gripping means;

a rotary valve means for controlling the operation of both said main and gripper fluid motor means; said rotary valve means including a valve block and a cooperating rotary valve member that is rotatably mounted in said valve block, said valve member being operative in successive predetermined discrete angular positions thereof to control the sequence of actuation of said fluid motor means;

a control member adapted to be shifted between first and second operative positions by the movement of the ram of said punch press; and

stepper means actuated by the shifting of said control member for intermittently indexing said valve member to, and stopping said valve member at, said successive predetermined discrete angular positions thereof whereby said feed slides may alternately partake of a rapid succession of feed strokes.

12. A duplex pneumatic feeder for intermittently advancing stock into the work station of a punch press or the like: comprising

a main frame;

a pair of alternately acting feed slides reciprocally carried by said main frame;

stock gripping means carried by each of said feed slides;

gripper fluid motor means carried by each of said feed slides for respectively actuating said stock gripping means;

a pair of main fluid motor means for respectively actuating said feed slides and each including a piston and a piston rod;

valve means for controlling the operation of said main and gripper fluid motor means;

feed slide guide means carried by said main frame and cooperating with said feed slides so as to constrain the motion of the latter to rectilinear movement on said frame, said guide means being arranged to permit the axes of the rectilinear paths of movement of said feed slides to be laterally shifted relative to the axis of said feeder; and

coupling means disposed between the outer end of the piston rod of each main fluid motor means and its respectively associated feed slide for permitting said lateral shifting of the said path of movement of each of said feed slides relative to the axis of its associated piston rod.

18. In a pneumatically operated stock feeder for intermittently advancing stock into the work station of a punch press or the like and having a frame;

feed slide means reciprocally mounted on said frame;

stock gripping means carried by said feed slide means;

gripper fluid motor means for actuating said stock gripping means;

main fluid motor means for actuating said feed slide means; and primary valve means adapted to supply and exhaust pressure fluid to and from each of said fluid motor means so that said feed slide means may partake of a succession of feed strokes: the improvement comprising

auxiliary valve means associated with said feed slide means for controlling only the release of said stock gripping means; and means for operating said auxiliary valve means to one operative condition thereof just after completion of a feed stroke of said feed slide means whereby said stock may be released by said stock gripping means, said auxiliary valve means being adapted to be moved to its other operative condition under the control of said primary valve means when the latter initiates the supply of pressure fluid to said gripper motor means prior to each feed stroke of said feed slide means.

29. In a pneumatically operated stock feeder for intermittently advancing stock into the work station of a punch press or the like and having

a frame;

feed slide means reciprocally mounted on said frame;

guide means for maintaining straight line reciprocating movement of said feed slide means;

main fluid motor means for reciprocally actuating said feed slide means;

stock gripping means carried by said feed slide means;

gripper fluid motor means for actuating said stock gripping means; and

valve means for controlling the operation of said main and gripper fluid motor means so that said feed slide means may partake of a succession of feed strokes: the improvement comprising

said frame including a main block portion, an end block portion and an intermedicate plate like portion interconnecting the lower regions of said main and end block frame portions, said feed slide means being mounted for reciprocation on the upper surface of said plate like frame portion;

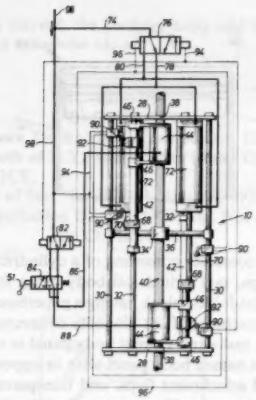
said guide means comprising a rail bar means which extends between said main and end block portions of said frame and which overlies said feed slide means, the bottom of said rail means and the top of said feed slide means being fomed with a cooperating longitudinal groove and projection arrangement whereby said feed slide means is constrained to rectilinear movement on said plate like intermediate portion of said frame.

4,051,988

TUBE FEEDING DEVICE FOR USE IN CHARGING SHOTHOLES WITH EXPLOSIVE THROUGH A PIPE OR TUBE

Bengt Gunnar Wilhelm Egerstrom, Danderyd, and Bror Lennart Teodor Sternhoff, Stockholm, both of Sweden, assignors to Nitro Nobel AB, Gyttorp, Sweden

Filed Aug. 13, 1976, Ser. No. 714,193
Claims priority, application Sweden, Aug. 19, 1975, 7509262
Int. Cl.[2] B65H *17/38*
U.S. Cl. 226—162 7 Claims



1. A device for feeding a tube into and out of a shothole for use in charging the shothole with an explosive, comprising

a pair of clamping devices each having therethrough an axial bore through which a tube is adapted to be advanced,

means guiding said clamping devices for reciprocable movement in a common path, and with their axial bores aligned coaxially of one another so that said tube may extend coaxially through both of said bores during the feeding thereof,

each of said clamping devices including a fluid pressure-operated wall of flexible material forming the axial bore through the device, and disposed selectively to grip the tube extending through said bore,

a pair of parallel cylinders each having a reciprocable piston rod operatively connected to one of said clamping devices to impart reciprocation thereto,

means for connecting said cylinders to a supply of fluid under pressure, and operative to cause said fluid to impart reciprocation to said piston rods simultaneously to move said clamping devices alternately towards and away from each other,

means including said guiding means for selectively and intermittently connecting said clamping devices to said fluid supply, when said devices are in one of their limit positions, and operative to convey fluid under pressure from said supply to the flexible walls in said clamping devices thereby to cause said walls momentarily to collapse radially inwardly and one at a time into gripping engagement with the tube extending through said bores, whereby during the period when one of said clamping devices is in gripping engagement with said tube the other clamping device will not be in operation, and will be moving in a direction opposite to that in which the tube is being fed, and

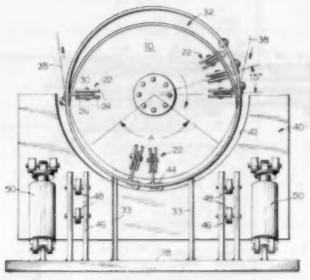
means for selectively changing the feeding direction of said tube by changing the mutual gripping sequences of said clamping devices.

4,051,989

CABLE PULLING APPARATUS

James N. Zehren, Bartlesville, Okla., assignor to TRW Inc., Cleveland, Ohio

Filed Sept. 24, 1975, Ser. No. 616,320
Int. Cl.[2] B65H *17/20*
U.S. Cl. 226—190 6 Claims



1. Apparatus for moving a flexible elongated member, comprising a rigid wheel supported for rotation about an axis and having as a part thereof of circular abutment surface along the circumference of the wheel against which the elongated member is to be clamped during rotation of the wheel, a plurality of clamping means supported upon the wheel at positions spaced circumferentially of the wheel, each of said clamping means comprising a clamp element supported for movement toward and away from said abutment surface, guide means adjacent to the wheel for moving said clamp elements toward said abutment surface during a portion of the rotation of the wheel and for moving said clamp elements away from said abutment surface during another portion of the rotation of the wheel, and means for pressing said clamp elements toward said abutment surface and against said elongated member located between said clamp elements and said abutment surface during a portion of the rotation of said wheel intermediate the aforesaid portions, said pressing means comprising a stationary abutment surface, each of said clamp elements having means for engaging said stationary abutment surface said engagement with said stationary abutment surface applying a force to a clamp element and forcing the clamp element toward the abutment surface of said wheel to clamp said elongated member against the abutment surface of said wheel.

4,051,990

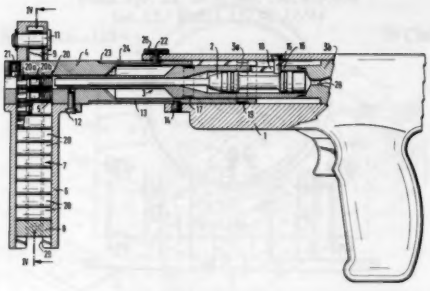
DEVICE FOR SECURING AN EXPANSION ANCHOR

Franz Chromy, Feldkirch-Levis, Austria; Walter Winkler, Gams, Switzerland; Manfred Mähr, Schlins, and Fritz Mark, Mader, both of Austria, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed July 1, 1975, Ser. No. 592,348
Claims priority, application Germany, July 8, 1974, 2432642
Int. Cl.[2] B25C *1/14*
U.S. Cl. 227—10 12 Claims

1. A device for driving an expansion anchor, which includes an anchor sleeve and expansion element positioned within and axially displaceable within the anchor sleeve from a loading position to an anchored position, into a prepared hole in a receiving material, comprising a piston-type explosive powder charge driven setting gun, said gun comprising a housing having an axially extending first bore therein open in the firing direction of said gun, an expansion anchor guide member axially displaceably mounted within the bore in said housing and projecting outwardly from said housing through the open end of said bore, said guide member having an axially extending second bore therein in substantially parallel relationship with said first bore and the end of said second bore facing in the firing direction being open, the second bore arranged to receive an expansion anchor therein in the end facing in the

firing direction and first means and second means each axially displaceably mounted within said second bore, said first means being axially displaceable relative to said guide member for inserting the expansion anchor from the second bore into a prepared hole with the expansion element in the loading position within the anchor sleeve, and when the expansion anchor



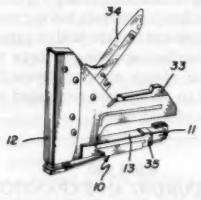
is inserted into the prepared hole said second means being axially displaceable relative to said guide member and to said first means for driving the expansion element in the firing direction axially through said anchor sleeve from the loading position into the anchored position for securing the expansion anchor within the prepared hole.

4,051,991

STAPLER ATTACHMENT

Harry M. Goodchild, Worcester, Mass., assignor to Parker Manufacturing Company, Worcester, Mass.

Filed Nov. 19, 1976, Ser. No. 743,280
Int. Cl.[2] B25C *7/00*
U.S. Cl. 227—155 **9 Claims**



1. Stapler assembly, comprising

a. a main housing having a grip handle and an operating handle,

b. an elongated staple storage compartment underlying the main body and extending in the same general direction as the grip handle, the compartment having a box-like cross-section with an upper wall and side walls,

c. a U-shaped staple track slidable along the compartment for loading staples and having a bottom wall which underlies the compartment and upwardly-directed side walls that embrace the side walls of the compartment, the side walls of the track having upper edges that lie substantially below the said upper wall of the compartment, so that a recess is formed by the said upper edge of the track and the side walls of the compartment, and

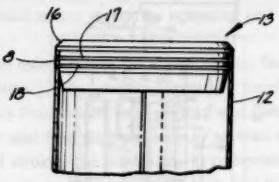
d. an attachment formed of an elastomer material and having a first portion lying against the bottom wall of the track with a pair of arms embracing the side walls of the track, the arms having inwardly-directed lugs that reside in the said processes, the attachment having a second portion that lies at an acute angle to the first portion and, carries a staple-bending device in a position underlying the main housing.

4,051,992

CYLINDRICAL DISPLAY CONTAINER FORMED FROM A FLAT BLANK

Robert M. Bergstein, Cincinnati, Ohio, assignor to Bergstein Packaging Trust, Middletown, Ohio

Filed Apr. 30, 1976, Ser. No. 681,819
Int. Cl.[2] B65D *3/04*
U.S. Cl. 229—21 **1 Claim**



1. A display container consisting of a cylindrical body and a pair of end caps, said cylindrical body being formed from a knock-down, flat-folded blank having a paperboard body panel and a pair of attachment flaps hingedly connected to its opposite side edges, and a transparent body panel in opposing relation to said first named body panel with its opposite side edges secured to said attachment flaps, said transparent body panel being formed from a self-sustaining flexible sheet of plastic material, said first named paperboard body panel having a width equal to one-half the perimeter of the container body when erected into essentially cylindrical form, with the remaining one-half of the container body defined by said transparent body panel and said attachment flaps, said attachment flaps acting to hingedly connect the opposite side edges of said transparent panel to said paperboard body panel, whereby the flat-folded blank may be erected to cylindrical configuration by flexing the body panels outwardly relative to each other, whereupon the end caps may be inserted into the opposite ends of the cylindrical body to maintain it in erected condition and close its opposite ends, said end caps having annular body portions of a size to be snuggly received in the ends of the container body when in essentially cylindrical form, at least one annular ridge on the body portion of each of said end caps, and ridge defining score lines in said paperboard body panel extending parallel to and adjacent the opposite end edges thereof, said score lines being positioned to enter into operative engagement with the annular ridges on the body portions of said end caps, whereby to tightly secure the end caps to said container.

4,051,993

POPCORN PACKAGE FOR TWO USERS

Alex J. Castoldi, Jr., West Newton, Mass., assignor to International Recreational Industries, Inc., Boston, Mass.

Filed Aug. 18, 1976, Ser. No. 715,622
Int. Cl.[2] B65D *5/72, 5/10*
U.S. Cl. 229—22 **3 Claims**

1. A package for a comestible allowing two theatre patrons seated side-by-side in two theatre seats to consume the comestible in said package conveniently, said package comprising an elongated continuous undivided package body having a single continuous comestible chamber, said package body having a flat bottom wall for stability when the package is resting on the laps of two users, the package body having a sufficient length to extend approximately between the centers of two adjacent

theatre seats, and means forming a pair of separated top product access and removal openings in the package body near

opposite ends thereof, the package body and said comestible chamber being otherwise closed.

4,051,994

BAG CLOSURE

Daniel Lawrence Donk, Phelps, and Robert Hutchins Olson, Pittsford, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 387,557, Aug. 10, 1973, abandoned.
This application Dec. 12, 1975, Ser. No. 640,319
Int. Cl.[2] B65D *33/30*
U.S. Cl. 229—65 **3 Claims**

1. A thermoplastic bag comprising a front wall and a rear wall continuously joined together along the bottom and vertical side edges, said bag being opened at the top along the top edges of said front and rear walls, a single strip of metallic foil secured to one of said walls adjacent said open top edges of said bag, said foil being in the form of a V-like configuration with the apex of said V being vertically oriented with respect to said bag walls.

4,051,995

STUFFED ENVELOPE ASSEMBLY

Robert L. Wieman, Sycamore, Ill., assignor to Duplex Products, Inc., Sycamore, Ill.

Filed Dec. 1, 1975, Ser. No. 636,809
Int. Cl.[2] B65D *27/10*
U.S. Cl. 229—69 **10 Claims**

1. A continuous assembly of record sheets and stuffed envelopes, which comprises

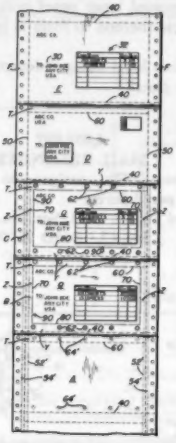
a plurality of overlying continuous plys,

longitudinal and transverse lines of weakening in each of said plys which subdivide them into similar sized record, front, insert and rear panels each of which have corresponding top, bottom and side edges with removable feed strips along their respective side edges,

another transverse line of weakening in spaced parallelism with the top edge of the insert, front and rear panels for defining a tear strip in and across the upper end of said panels,

other lines of weakening in the insert panels in spaced parallelism with the bottom and side edges thereof defining a central, removable portion,

means interconnecting the marginal portions of the front, insert and rear panels along the tear strips and outwardly of the central, removable portion of the insert panels for defining a stuffed envelope which is separable along the first mentioned transverse lines of weakening from adjoining envelopes of the continuous envelope assembly, and



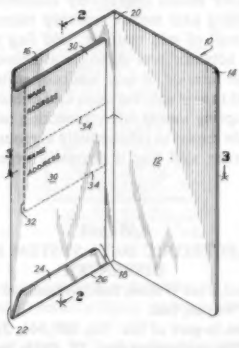
other means interconnecting the feed strips of the record, front, insert and rear panels of the envelope assembly, the record panel per se being disposed in free, overlying, aligned but unattached relationship with the front panel of its respective stuffed envelope.

4,051,996

TRAVEL ENVELOPE CONSTRUCTION HAVING INTEGRALLY FORMED BAGGAGE IDENTIFICATION LABELS

Martin I. Ross, New York, and Arthur M. Rogers, Far Rockaway, both of N.Y., assignors to Exclusive Envelope Corporation, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,058
Int. Cl.[2] B65D *27/08*
U.S. Cl. 229—72 **49 Claims**



1. A wallet-type envelope construction comprising

an outer panel, and

an inner panel,

said outer panel being secured to said inner panel along a common edge,

means for securing the bottom edge portion of said inner panel to the bottom edge portion of said outer panel,

said inner and outer panels having at least two other edges

disposed in unsecured and free relationship with respect to one another,

said outer and inner panels defining a pocket therebetween capable of having tickets and the like positioned therein,

at least a portion of said inner panel having an adhesive layer disposed on the rear surface thereof,

said adhesive coated inner panel portion having name and address indicia thereon to form at least one identification label, and

said identification label being a detachably secured portion of said inner panel.

4,051,997

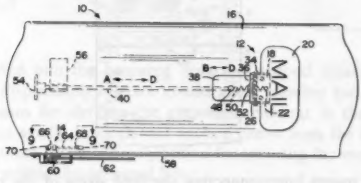
MAIL REMINDER

Steve Garcia, Tampa, Fla., assignor to James W. Donofrio, Tampa, Fla., a part interest

Filed Feb. 3, 1975, Ser. No. 546,680

Int. Cl.[2] B65D *91/00*

U.S. Cl. 232—35 **4 Claims**



1. A mail reminder device of the type designed to be mounted on a mailbox including a flag operatively mounted thereon, said device comprising: a signal means disposed on the top of said mailbox, said signal means comprising an attachment plate fixedly attached to said top, an indicator hingedly connected to said attachment plate, a stop plate movably attached to said top in engaging relation to said indicator, first biasing means disposed in interconnecting relation between said attachment plate and said indicator, whereby said indicator is normally urged toward a substantially perpendicular position with respect to said top, and a stop arm slidingly disposed on the inside of said top, one end of said stop arm being fixedly attached to said stop plate and second biasing means disposed in interconnecting relation between said stop arm and said top inside, whereby said one end of said stop arm and said stop plate are normally urged toward said indicator; and flag retractor means operatively connected to said flag, said flag including axle means movably interconnecting said flag to a side wall of said mailbox, said flag retractor means comprising an actuator arm slidingly attached to one end of said axle on the interior of said mailbox, spring guide means fixedly attached to said axle between said actuator arm and said side wall, and spring means interconnecting said side wall and said spring guide means in substantially surrounding relation to said axle, whereby said flag is normally urged to a lowered position.

4,051,998

DIGITAL ELECTRONIC DATA SYSTEM FOR A FLUID DISPENSER

William P. Zabel, Fort Wayne, Ind., assignor to Tokheim Corporation, Fort Wayne, Ind.

Continuation-in-part of Ser. No. 380,944, July 20, 1973, abandoned. This application Jan. 27, 1975, Ser. No. 538,888

Int. Cl.[2] B67D *5/08*; G06F *15/20*

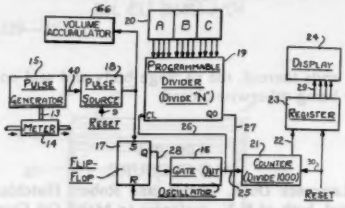
U.S. Cl. 364—465 **41 Claims**

1. A data system for use in a fluid dispenser for producing an output signal corresponding in direct proportion to the accumulative cost of the fluid dispensed dependent upon a a variable preset signal representative of a price for each unit volume of fluid actually dispensed, the combination comprising:

a. pulse generator means coupled to said dispenser for generating an enabling pulse for each predetermined fraction of a unit quantity of liquid dispensed;

b. oscillator means operable between an idle condition and an activated condition in response to a disabling pulse and said enabling pulse, respectively, for generating a burst of pulses in response to said enabling pulse;

c. presettable switch means manually movable through a plurality of positions for generating continuously a coded signal of varying weight proportional to the selected price for each unit volume of fluid;



d. registry means connected to said presettable switch means to receive said coded signal and to said oscillator means to receive said burst of pulses for producing said disabling pulse when the number of said oscillator means burst of pulses is equal to said coded signal; and

e. counting means including dividing means connected to said oscillator means to receive said number of said burst of pulses for dividing said number of pulses by said predetermined fraction of a unit quantity to generate an output signal proportional to the accumulated cost of said increment of fluid dispensed.

4,051,999

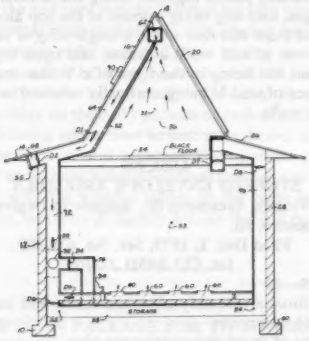
ENVIRONMENTALLY HEATED AND COOLED BUILDING

Floyd Randolph Granger, 24 Heard Drive, and Michael Gerard Granger, 10 Delores St., both of Greenville, S.C. 29605

Filed Apr. 5, 1976, Ser. No. 673,664

Int. Cl.[2] F24D *5/00, 11/00*; F24J *3/02*; G05D *23/00*

U.S. Cl. 237—1 A **4 Claims**



1. In combination a solar heated building comprising: a collector means carried in the attic of said building for absorbing solar energy and heating the air within said attic,

a thermal storage chamber carried below the bottom floor of said building,

said thermal storage chamber including a rock bed extending substantially under the entire area of said floor,

a lower plenum positioned substantially in the middle of said rock bed extending transverse thereof,

air flow passages provided in opposite walls of said lower plenum extending into said rock bed,

duct means connected between said attic and said plenum

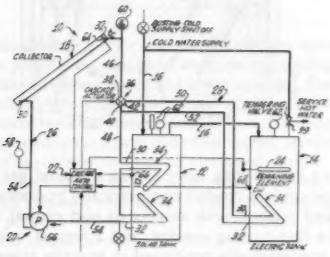
through which conditioned air passes between said attic and said storage chamber,
a fan connected to said duct means for circulating air therethrough,
registers carried in said floor and connected to said duct means for supplying conditioned air to said building,
said duct means including an outside air arm communicating with the air outside said building,
power operated damper means provided in said duct means for selectively controlling the path that said air flows through said storage chamber, said building, said attic and through said outside air arm,
said thermal storage chamber having an inlet and outlet through which air flows,
first and second sensors positioned adjacent said inlet and said outlet of said thermal storage chamber generating signals indicating the temperature at said locations,
additional sensors located to generate signals indicating the temperature of the outside air, the temperature of the air in said attic and the temperature of the air in said building, and
control means connected to said sensors for activating said power operated damper means for controlling the air flow path through said building, storage chamber and said attic responsive to predetermined conditions.

4,052,000

SOLAR ENERGY AUGMENTED WATER HEATING SYSTEM

Terence C. Honikman, Santa Barbara, Calif., assignor to Allen K. Cooper, Santa Barbara, Calif., a part interest

Filed Apr. 19, 1976, Ser. No. 677,912
Int. Cl.[2] F24J *3/02*; F24D *3/00*
U.S. Cl. 237—1 A **24 Claims**



22. A solar energy augmented water heating system, such as a domestic hot water system, comprising:
a water storage and heating tank including a water heater,
a solar energy storage tank,
means for conducting water through said solar tank and then through said water tank,
a solar collector, and
means for circulating a heat transport liquid selectively either through said collector and said solar tank or through said collector, said water tank, and then through said solar tank.

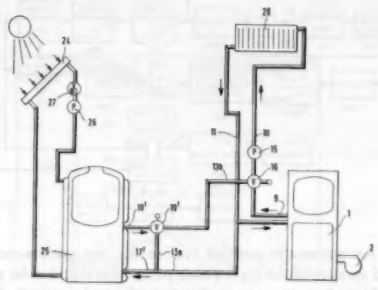
4,052,001

HEATING SYSTEM

Alfred Vogt, Schaan, Liechtenstein, assignor to Interliz Anstalt, Vaduz, Liechtenstein

Filed Sept. 15, 1976, Ser. No. 723,607
Claims priority, application Austria, Oct. 1, 1975, 7516/75
Int. Cl.[2] F24D *3/00*
U.S. Cl. 237—1 A **9 Claims**

1. A heating system comprising:
a. first heating means for supplying thermal energy to a fluid to be heated;
b. a return line and a discharge line respectively connected to said heating means for feeding thereto the fluid to be heated and for withdrawing the heated fluid therefrom;
c. a mixing valve in said discharge line;
d. a three way valve having a first, a second, and a third port;
e. a by-pass line connecting said return line to said mixing valve, respective portions of said by-pass line connecting said return line to said first port and said second port to said mixing valve;



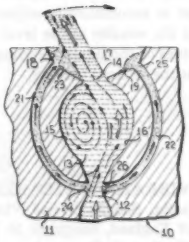
f. second heating means for supplying thermal energy to said fluid; and
g. an intake line and an output line connected to said second heating means for feeding thereto the fluid to be heated and for withdrawing the heated fluid therefrom, one of said intake and output lines communicating permanently with one of said first and second ports, and the other one of said intake and output lines communicating permanently with said third port.

4,052,002

CONTROLLED FLUID DISPERSAL TECHNIQUES

Ronald D. Stouffer, Silver Spring, and Harry C. Bray, Jr., Beltsville, both of Md., assignors to Bowles Fluidics Corporation, Silver Spring, Md.

Continuation of Ser. No. 510,722, Sept. 30, 1974, abandoned.
This application Sept. 30, 1975, Ser. No. 618,208
Int. Cl.[2] B05B *1/08*
U.S. Cl. 239—4 **86 Claims**



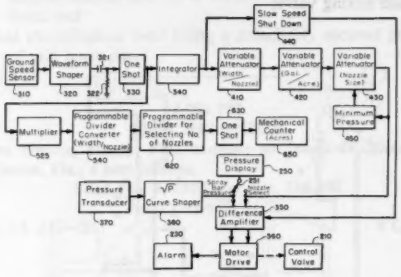
1. A liquid spray apparatus comprising:
means adapted to receive liquid under pressure and form a liquid jet;
means powered solely by the liquid under pressure for cyclically deflecting said jet in a prescribed path between extreme positions defined by a pair of walls; and
means for flowing said liquid along said walls to prevent said jet from impinging directly on said walls when approaching said extreme positions;
whereby said cyclically deflected jet breaks up into liquid droplets distributed over a spray pattern determined by said prescribed path.

4,052,003

LIQUID SPREADER CONTROL SYSTEM

Ronald W. Steffen, Chatham, Ill., assignor to Dickey-john Corporation, Auburn, Ill.

Filed Aug. 6, 1976, Ser. No. 712,146
Int. Cl.[2] B05B *12/00*
U.S. Cl. 239—71 **26 Claims**



1. An automatic control system for use with a vehicular liquid sprayer of the type which pumps the liquid to be sprayed at a desired pressure to a plurality of nozzles which dispense the liquid at a predetermined desired density relative to the area being sprayed, said density being a function of a plurality of liquid spraying parameters which may vary from one spraying application to another or from time to time during a given spraying application, said control system comprising: means for sensing the pressure of the liquid supplied to said nozzles and developing a corresponding electrical liquid pressure signal; means for measuring the ground speed of said vehicular sprayer and developing a corresponding electrical ground speed signal; programming means coupled to said ground speed measuring means for selectively modifying said ground speed signal to obtain a modified ground speed signal having a characteristic which corresponds to the values of at least two of said liquid spraying parameters required to obtain said desired density; means responsive to said liquid pressure signal and said modified ground speed signal for generating a corresponding valve control signal; and control valve means operatively coupled to said nozzles and responsive to said valve control signal for adjusting the rate of flow of said liquid to said nozzles to adjust the pressure of the liquid at the nozzles in accordance with said valve control signal, whereby the vehicular liquid sprayer is automatically adjusted to maintain the system pressure at the nozzles at the level which corresponds to the selected values of the liquid spraying parameters to thus spray the liquid at the desired density.

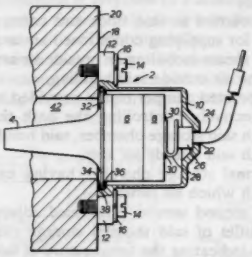
4,052,004

VIBRATORY ATOMIZER

Barrie James Martin, Shenfield, and Victor Ernest Bridger, London, both of England, assignors to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Feb. 18, 1976, Ser. No. 659,156
Claims priority, application United Kingdom, Feb. 19, 1975, 6949/75
Int. Cl.[2] B05B *3/14*
U.S. Cl. 239—102 **5 Claims**

1. A vibratory atomizer for atomizing a liquid due to vibrations of the atomizer, which atomizer comprises a nozzle portion from which the liquid is ejected, a body portion having vibration means, a cover which fits over the body portion, and resilient means adapted to mount the body portion within the cover, wherein said cover is fastened to a mounting surface and in which said resilient means engages the mounting surface, thereby to provide a seal at the point of engagement, and the body portion and the cover both having means for positively locating the resilient means whereby the resilient means constitutes the sole means for mounting the body portion within the cover.

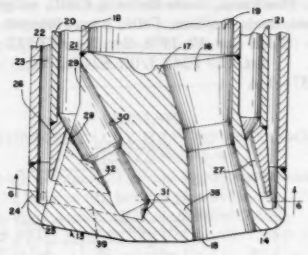


4,052,005

OXYGEN LANCE NOZZLE

Nicholas M. Rymarchyk, Jr., Pittsburgh, Pa., assignor to Berry Metal Company, Harmony, Pa.

Filed Mar. 11, 1976, Ser. No. 665,841
Int. Cl.[2] B05B *15/00*
U.S. Cl. 239—132.3 **27 Claims**



1. For a gas blowing lance having a central gas conduit, a first water coolant conduit concentrically positioned in laterally spaced relation with respect to said central conduit to provide a first cooling passage, and a second water coolant conduit concentrically positioned in laterally spaced relation relative to said second conduit to provide a second cooling passage, the improvement comprising;

a nozzle tip having a cylindrical body connected to said conduits and provided with a lower face,

gas passage means extending substantially vertically within said body communicating with said central gas conduit,

said gas passage means including opening means in said cylindrical face,

a circumferentially extending flange formed at the lower portion of said body extending vertically upwardly and spaced radially outwardly from said body to provide a cylindrical water chamber about the lower portion of said body,

said second conduit being connected to said flange to provide communication between said second cooling passage and said cylindrical water chamber,

a ring-shaped shelf supported on said cylindrical body and projecting radially outwardly with respect thereto,

said shelf being connected to said first conduit and having vertical passage means in communication with said first cooling passage and said water chamber,

water by-pass means in said body including inlet bore means communicating with said first water passage extending from the upper portion of said body diagonally inwardly and downwardly, and

outlet passage means in said body communicating with said inlet bore and extending radially outwardly and directly communicating with said cylindrical water chamber below said ringshaped shelf,

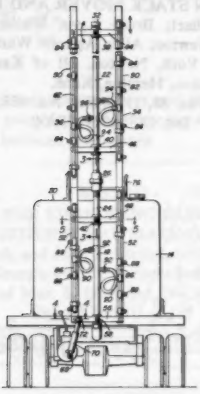
said outlet passage means including means for effecting nucleate boiling of the water to maximize heat transfer thereto.

4,052,006

FOLDING SPRAY BOOM

Henry G. Grass, Dinuba, Calif., assignor to James L. Grass and William H. Grass, both of Dinuba, Calif., part interest to each

Filed Sept. 29, 1976, Ser. No. 728,454
Int. Cl.[2] B05B *1/20, 3/14*
U.S. Cl. 239—168 **8 Claims**



1. In combination, a mobile chassis, a liquid tank mounted on said chassis and having opposite ends, an upstanding outlet pipe for said tank having upper and lower sections, first means mounting said lower section from said chassis outwardly of one end thereof, second means removably and sealingly coupling and supporting the lower end of said upper section on the upper end of said lower section, an elongated upright support generally paralleling said pipe and including vertically spaced spray nozzles thereon, said upright support including upper and lower portions spaced alongside said upper and lower sections, third means pivotally attaching the lower end of said upper portion to the upper end of said lower portion for angular displacement of said upper portion relative to said lower portion about a horizontal axis between an upright position and a generally horizontal position disposed over said tank, fourth means guidingly supporting said upper and lower portions from said upper and lower sections, respectively, for generally longitudinal shifting of said portions relative to the corresponding sections, flexible means communicating said pipe sections with the spray nozzles on the corresponding support portions, means communicating the interior of said tank with the interior of said outlet pipe, and drive means connected between said chassis and said lower support portion for vertically oscillating said upstanding support.

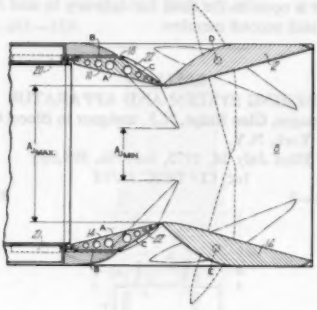
4,052,007

FLAP-TYPE TWO-DIMENSIONAL NOZZLE

Charles M. Willard, Crevecoeur, Mo., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 25, 1975, Ser. No. 635,187
Int. Cl.[2] B64C *15/04*
U.S. Cl. 239—265.29 **5 Claims**

1. A two-dimensional exhaust nozzle, said nozzle having a rectangular inlet, fixed sides extending rearwardly from each side of said inlet, a pair of throat area control primary flaps, one throat area control primary flap being located immediately downstream of said rectangular inlet at the top thereof, the other throat area control primary flap being located immediately downstream of said rectangular inlet at the bottom thereof, first means for moving said pair of throat area control flaps between a position where the downstream ends form a minimum throat area and a position where the downstream ends form a maximum throat area, a pair of rotatable flaps, one rotatable flap being located downstream of the top throat area control primary flap, the other rotatable flap being located downstream of the bottom throat area control primary flap,



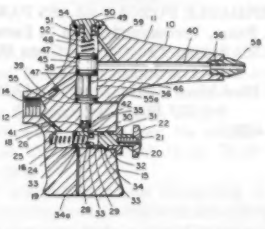
second means for moving said pair of rotatable flaps from a position where they form the divergent section of a convergent-divergent nozzle having the forward end of each rotatable flap positioned adjacent the rearward end of its cooperating throat area control primary flap when the throat area control primary flaps are at their position of maximum throat area to a position where they form an ejector shroud of an ejector nozzle having the forward end of each rotatable flap spaced outwardly from the rearward end of its cooperating throat area control primary flap when the throat area control primary flaps are at their position of minimum throat area.

4,052,008

BLOW GUN

Gerald Lee Rogers, St. Louis, Mo., assignor to Chemetron Corporation, Chicago, Ill.

Filed Apr. 12, 1976, Ser. No. 676,105
Int. Cl.[2] B05B *1/00*
U.S. Cl. 239—526 **9 Claims**



1. A blow gun comprising:

a. a housing having an inlet adapted to be connected to a source of fluid and a fluid outlet, said housing also having a handle adapted to be grasped by an operator;

b. a trigger movably mounted on said handle;

c. a first valve member movably mounted in said housing for movement by said trigger, said first member being in communication with said inlet;

d. a second valve member movably mounted in said housing, said second member being a spool valve and in communication with said inlet and outlet, said second member

having a first portion in communication with said first member, and a second portion for shutting off flow to said outlet and having a larger effective area than said first portion;

e. means for biasing said second member toward a position to shut off flow to said outlet; and

f. a bypass conduit in communication with said outlet and said second portion, said bypass conduit, upon blockage of said outlet, providing access for the fluid to said second portion to move said second member to shutt off flow to said outlet when said trigger is depressed and said first member is open to the fluid for delivery to said first portion of said second member.

4,052,009

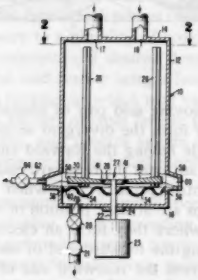
FIBERING SYSTEM AND APPARATUS

Ronald A. Penque, Glen Ridge, N.J., assignor to Biocel Corporation, New York, N.Y.

Filed July 14, 1975, Ser. No. 595,855

Int. Cl.² B02C *19/18*

U.S. Cl. 241—1 **31 Claims**



19. A process of defibering cellulosic material in medium comprising a mixture of a liquid and said cellulosic materials to be defibered, said process comprising the steps of:

impelling a liquid so as to propagate pressure waves through a moveable diaphragm membrane in contact with said liquid to said medium on the other side of said diaphragm so that said cellulosic material is defibered by said pressure waves.

4,052,010

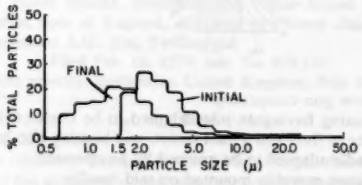
SUSPENDABLE POROUS GLASS PARTICLES

Frederick G. Baker, Tyrone, and David L. Eaton, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 1, 1974, Ser. No. 447,250

Int. Cl.² B02C *23/08, 23/20*

U.S. Cl. 241—20 **10 Claims**



1. A method of preparing a suspension of porous glass particles of controlled particle size and useful as antibody carriers in solid phase radioimmunoassay comprising the steps of:

A. milling controlled pore porous glass particles having an average pore diameter between about 100 A and 1200 A to an average particle size of less than about 10 microns;

B. acid-washing the milled particles to remove contaminants and residues;

C. washing the particles to remove any residues from step (B);

D. mixing the washed particles with water to form a first suspension of the particles;

E. subjecting the first suspension to a first sedimentation step to assure removal of particles greater than about 10 microns;

F. subjecting the remaining first suspension to at least one more sedimentation step to sediment particles having an average particle size between about 0.7 and about 3.0 microns; and

G. suspending the particles of step (F) in water.

4,052,011

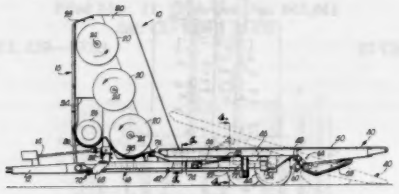
COMBINATION STACK MOVER AND PROCESSOR

Merle Keith Burkhart; Bruce Lynn White; La Vern Roy Goossen, all of Newton; Allen Andrew White, Peabody, and Harold William Voth, Newton, all of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Jan. 28, 1976, Ser. No. 653,146

Int. Cl.² A01F *29/00*

U.S. Cl. 241—30 **9 Claims**



1. A method of reducing a large mass of crop material including the steps of:

engaging an upstanding crop mass from beneath the latter with a horizontally moving conveying force to advance the mass in the direction of movement of said conveying force;

continuing said advancement of the mass using said conveying force only as the mass is progressively delivered into the mechanism for shredding the same;

passing said mass over a standby source of swingable lifting force on the way to said mechanism; and

after shredding most of the original mass using said conveying force only, restraining the remaining portion of the upstanding mass against tipover and feeding the same into the mechanism using said swingable lifting force only.

4,052,012

PORTABLE FLOUR MILL

Donovan R. Feist, Minot, N. Dak., assignor to Mill & Mix Company, Inc., Brigham City, Utah

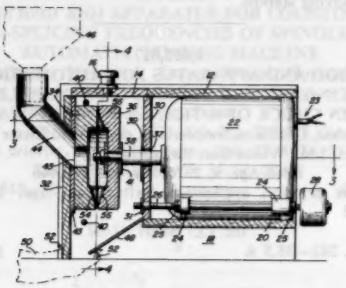
Filed Mar. 13, 1974, Ser. No. 450,794

Int. Cl.² B02C *7/14*

U.S. Cl. 241—100 **13 Claims**

1. A grain mill having one rotatable stone and one non-rotatable stone in facing relationship to each other, a grain feeding means associated with the non-rotatable stone to feed grain between the stones, collecting means for receiving ground material discharged from the peripheries of the stones, means for driving the rotatable stone, means for adjusting the spacing between said stones, said means for driving said rotatable stone and the means associated with said non-rotatable stone being surrounded by an outer housing including a top wall, vertical side walls, an exterior vertical end wall, a partial bottom wall under a motor for actuating the means for driving said rotatable stone, an interior wall parallel to said end wall and between said motor and said end wall, said means for adjusting the spacing between said stones including a sleeve portion on

the periphery of said motor, a threaded rod passing through said interior wall and said sleeve and having a turning knob attached at one end thereof, whereby manual rotation of said



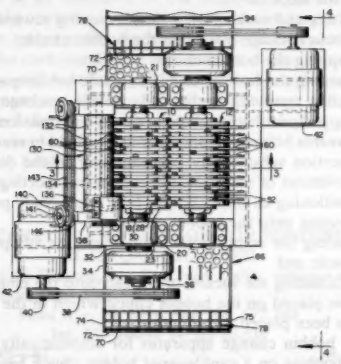
threaded rod, via said knob, moves said motor and associated stone toward or away from said non-rotatable stone for adjusting the spacing between said stones.

4,052,013

APPARATUS FOR SHREDDING RUBBER TIRES AND OTHER SCRAP MATERIALS

Stanley V. Ehrlich, and John T. Ehrlich, both of Portland, Oreg., assignors to Georgia-Pacific Corporation, Portland, Oreg.

Filed Mar. 8, 1976, Ser. No. 665,045
Int. Cl.[2] B02C *13/26*
U.S. Cl. 241—101.2 **3 Claims**



1. A shredding apparatus comprising:

a pair of side-by-side parallel and generally cylindrical shredding drums,

each said drum defining a series of axially spaced-apart circular cutting discs,

each said cutting disc having a smooth cylindrical peripheral surface intersecting parallel opposed sidewalls so as to define a pair of substantially continuous circular cutting edges,

each said drum being mounted with respect to the other said drum such that discs of one drum extend into the spaces between discs of the opposing drum,

drive means for counterrotating said drums,

said rotatable grinding wheel means positionable alongside said drums with the axis of rotation thereof parallel to the axes of rotation of said drums and extending the length of the adjacent said drum when in an operating position,

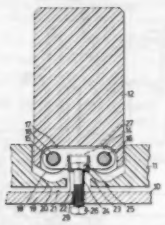
said grinding wheel means including drive means for rotating said grinding wheel means about its axis of rotation and means for moving said grinding wheel means into and out of grinding engagement with the cylindrical surfaces of the cutting discs of an adjacent said drum.

4,052,014

ARRANGEMENT IN MILL DRUMS PROVIDED WITH WEAR PROTECTIVE LININGS

Erik Alfon Jonsson, Boliden, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden

Filed Mar. 4, 1976, Ser. No. 663,765
Claims priority, application Sweden, Mar. 7, 1975, 7502606
Int. Cl.[2] B02C *17/22*
U.S. Cl. 241—183 **18 Claims**



1. An arrangement in mill drums having wear protective linings and ore lifting and carrying means in the form of a wing comprised of an elastomeric material and extending radially inwardly from the lining of the mill drum, said wing being secured to the wall of the mill drum by means of securing mans including a securing bolt which protrudes beyond the external surface of the wall of the drum through a corresponding bolt hole through said wall to receive a locking means for said bolt urgeable against the outside of said drum, said securing means extending into a root portion of said wing and being retained in said root portion by means of anchoring means, said securing means being surrounded by peripherally continuous wallings spaced apart along the wing, said wallings forming integral parts of the material of said root portion, said anchoring means extending in the longitudinal direction of said wing within said wallings and through said securing means, the securing means having at those parts thereof which xtend into said root portion, yoke means also secured to the wall of the drum by said securing bolt and positioned transversely to the longitudinal direction of said wing and received in spaces between said wallings in said root portion, said yoke means having apertures therein, said apertures receiving said anchoring means.

4,052,015

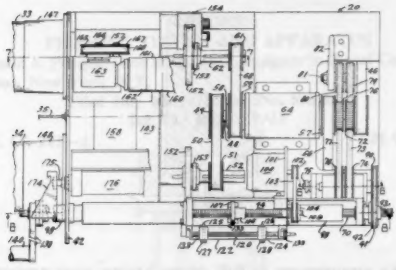
FILAMENT WINDING APPARATUS

Ronnie D. Hand; Robert N. Chappelear, both of Anderson, S.C., and Dale R. Mueller, Toledo, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jan. 5, 1976, Ser. No. 646,739
Int. Cl.[2] B65H *54/02, 54/28, 79/00*
U.S. Cl. 242—18 G **3 Claims**

1. Filament winding apparatus comprising a turret body mounted for rotation about a horizontal axis, means for periodically indexing the turret body, a pair of strand winding collets mounted on the turret body and respectively including a pair of winding collet shafts extending through the turret body for rotation respectively about axes parallel to and equal distances from the axis of rotation of the turret body, a pair of rotatably driven members mounted respectively on the winding collet shafts on the opposite side of the turret body from the winding collets, a first shaft spaced from the turret body axially thereof and mounted for rotation about an axis coaxial with the axis of rotation of the turret body, a hollow second shaft mounted concentrically of the first shaft for rotation independently thereof, the first shaft being longer than the second shaft and projecting outwardly from opposite ends thereof, a first pair of

rotatable driving members mounted respectively on first end portions of the first and second shafts, means respectively operatively connecting the first pair of rotatable driving members on the first end portions of the first and second shafts with the rotatably driven members on the winding collet shafts, a pair of variable speed motors respectively including a pair of motor shafts, a pair of rotatable driving members mounted respectively on the motor shafts, a pair of rotatably driven members mounted respectively on second end portions of the first and second shafts, means respectively operatively connecting the rotatable driving members on the motor shafts with the rotatably driven members on the second end portions of the first and second shafts, a second pair of rotatable driving



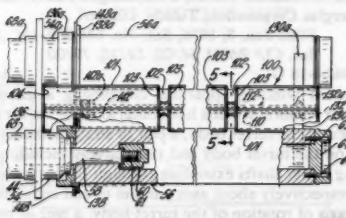
members mounted respectively on the second end portions of the first and second shafts, a strand oscillator shaft transversely spaced from the turret body and mounted for rotation about an axis parallel to the axis of rotation of the turret body, a rotatably driven member mounted on the strand oscillator shaft, a clutch shaft spaced from and parallel to the strand oscillator shaft, a pair of one-way clutches mounted on the clutch shaft independently of each other, a rotatable driving member mounted on the clutch shaft, means respectively operatively connecting the second pair of rotatable driving members on the second end portions of the first and second shafts with the clutches on the clutch shaft, and means operatively connecting the rotatable driving member on the clutch shaft with the rotatably driven member on the strand oscillator shaft.

4,052,016

METHOD AND APPARATUS FOR REMOVING WOUND PACKAGES FROM A WINDING MACHINE

Cecil R. Cunningham, Aiken, S.C., and Alex P. Symborski, Newark, OH, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 11, 1975, Ser. No. 612,399
Int. Cl.² B65H 54/02
U.S. Cl. 242—18 G **9 Claims**



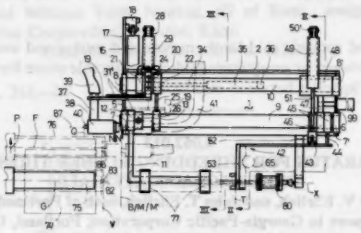
1. Apparatus comprising, a frame, an indexible head mounted by the frame, collets mounted by the head and movable by said head to a package winding position and to a package removing position, means for rotating the collets at the winding station for winding a strand on one of the collets to form a package of strand, baffle means mounted by said head and disposed adjacent the collets, means for indexing said head at the completion of the package at the winding station to move the collet bearing the completed package to the package removing station, and means mounted by the baffle means for moving the package along the length of the collet at the package removing station.

4,052,017

METHOD AND APPARATUS FOR AUTOMATICALLY CHANGING TEXTILE BOBBINS ON A CANTILEVERED BOBBIN CHUCK OF A TEXTILE WINDING MACHINE

Hugo Schär, Dattlikon, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Apr. 9, 1976, Ser. No. 675,446
Claims priority, application Switzerland, Apr. 16, 1975, 4829/75
Int. Cl.² B65H 67/04
U.S. Cl. 242—35.5 A **15 Claims**



1. A method of automatically changing textile bobbins on a cantilevered bobbin chuck of a textile winding machine, comprising the steps of:

a. cutting and sucking-off a thread moving towards a textile bobbin package placed on the bobbin chuck;
b. stopping the bobbin chuck;
c. grasping the end region of the textile bobbin package and axially removing such textile bobbin package from the stopped cantilevered bobbin chuck and transferring it to a movable bobbin transporting device held in readiness in a direction substantially perpendicular to the direction of movement of said movable bobbin transporting device;
d. positioning an empty bobbin tube into a ready position for donning onto the bobbin chuck;
e. placing the empty bobbin tube onto the stopped bobbin chuck; and
f. rethreading the sucked-off thread onto the empty bobbin tube placed on the bobbin chuck which in the meantime has been placed into rotation.

5. A bobbin change apparatus for automatically changing textile bobbins on a cantilevered bobbin chuck having a free end of a textile winding machine, comprising a bobbin package transporting device movable in a predetermined direction of travel, a bobbin tube gripper, means mounting the bobbin tube gripper to be axially movable in a bobbin package take-off direction between two terminal positions for taking-off a bobbin tube supporting a wound bobbin package from the free end of the bobbin chuck and for transferring the removed bobbin package to the bobbin package transporting device which is held in readiness, a bobbin package tube support arm, means for mounting said support arm for movement between a bobbin tube take-up position and a bobbin tube transfer position and in a direction substantially a right-angles with respect to the direction of movement of the bobbin tube gripper, said axially movable bobbin tube gripper being movable in a first direction for sliding an empty bobbin tube held in readiness by the bobbin tube support arm onto the free end of the bobbin chuck, a thread cutting and suction device, means for moving the thread cutting and suction device between a thread take-over position for cutting and sucking-off the thread moving towards the bobbin package and a thread transfer position for transfer-

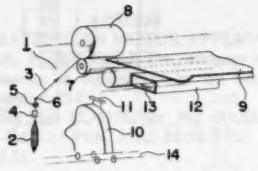
ring the sucked-off thread to the bobbin tube supported on the bobbin chuck.

4,052,018

METHOD AND APPARATUS FOR COUNTING YARN-SPLICING FREQUENCIES OF SPINDLES IN AUTOMATIC WINDING MACHINE

Takao Miyake, Neyagawi; Katsue Koashi, Toyonaka, and Masato Sawada, Amagasaki, all of Japan, assignors to Kurashiki Boseki Kabushiki Kaisha, Japan

Filed Oct. 26, 1976, Ser. No. 735,415
Claims priority, application Japan, Feb. 13, 1976, 51-15035
Int. Cl.[2] B65H *63/00, 54/02, 69/04*
U.S. Cl. 242—36 **6 Claims**



1. A method of counting yarn splicing operations due to normal and abnormal reasons in an automatic winding machine provided with a plurality of winding spindles and an automatic knotting machine circulating past said spindles for carrying out yarn splicing at each of said spindles when necessary, comprising the steps of detecting the operation of a slub catcher associated with each winding spindle and counting the number of operations as an indication of the number of yarn cuttings, detecting the occurrence of bobbin replacement for each winding spindle and counting the number of bobbin replacements, counting for each spindle the total number of the yarn splicing operations, and subtracting from the total number of yarn splicing operations the number of yarn cuttings and bobbin replacements for determining the number of yarn splicing operations due to causes other than the normal causes of yarn cuttings and bobbin replacements.

4,052,019

APPARATUS AND METHOD FOR WINDING ELASTOMERIC FIBER

Thomas David Dickson, Jr., San Jose, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Filed Apr. 15, 1976, Ser. No. 677,240
Int. Cl.[2] B65H *54/00, 63/08*
U.S. Cl. 242—47 **6 Claims**

1. Apparatus for winding an elastomeric fiber under no or low axial tension comprising in combination:

a. a housing;

b. a pair of wheels mounted on the housing in spaced relationship to each other that are adapted to receive and hold a spool of said fiber in the space between them and rotate the spool in response to their rotation;

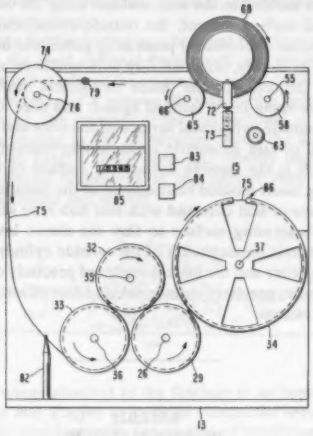
c. a fiber take off pulley mounted on the housing over which the fiber from the spool is threaded;

d. at least one fiber guide sheave mounted on the housing over which the fiber is threaded from the fiber take off pulley such that the fiber is wrapped about a substantial portion of its circumference;

e. a wind up reel mounted on the housing into which the fiber is threaded from the fiber guide sheave and wound;

f. means for driving the pair of wheels, the fiber take off pulley, the fiber guide sheave, and the wind up reel whereby the same are driven such that the linear speeds of the spool of fiber, the fiber guide sheave, and the wind up reel are substantially equal and the linear speed of the fiber take off pulley is substantially greater than the linear speed of the spool of fiber; and

g. means associated with the pair of wheels for varying the rotational speed thereof whereby the linear speed of the



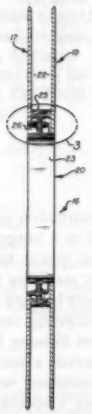
spool of fiber may be varied to compensate for its decrease in diameter as the fiber is taken off it and any inherent axial tension in the fiber on the spool and thereby maintain the linear speed of the spool substantially equal to that of the wind in up reel.

4,052,020

COMPUTER TAPE REEL

Jon A. Knox, 4625 E. Vista St., Long Beach, Calif. 90803

Filed Oct. 1, 1975, Ser. No. 618,392
Int. Cl.[2] B65H *75/18*
U.S. Cl. 242—71.8 **16 Claims**



1. An improvement in a computer reel of the type which stores magnetic tape and comprises an annular hub and two annular flanges coaxial with the bore of the hub and securely attached to the hub to define a tape housing space; said hub including a hub table formed as its outside cylindrical surface and a reel mounting face formed as a lateral surface adjacent to said bore and located on the rear side of the hub, which is the side that faces a mating drive spindle; and an annular feeler

switch channel adjacent to said mounting face and coaxial with said bore; wherein the improvement is:

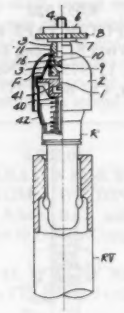
said hub consisting of a rigid annular hub core, which is the hub's major source of structural strength and dimensional stability, and a hub sleeve, which is a thin layer of plastic insert molded to the core and covering the outside cylindrical surface thereof; the outside cylindrical surface of said core unavoidably possessing geometric inexactitudes such as ovality, noncoaxiality with said bore, and molding sink depressions; the inside cylindrical surface of said sleeve being insert molded against said core to mate with the outside cylindrical surface of the core and to conform to all of said geometric inexactitudes thereof; said table, which is the outside cylindrical surface of said sleeve, being insert molded independent of the outside cylindrical surface of said core and with said hub bore serving as the core's locating surface so that the sleeve levels out the geometric inexactitudes of the outside cylindrical surface of the core and the table is rendered precisely coaxial with the bore, precisely cylindrical, and free of intolerable sink depressions.

4,052,021

BOBBIN HANGER

Zenzaburo Tsukumo, Ikeda, Japan, assignor to NTN Toyo Bearing Co. Ltd., Ikeda and Zenzaburo Tsukumo, Osaka, both of, Japan

Filed Feb. 5, 1976, Ser. No. 655,488
Claims priority, application Japan, Jan. 17, 1976, 51-4283
Int. Cl.² B65H *49/02*; D03J *5/08*
U.S. Cl. 242—130.2 **7 Claims**



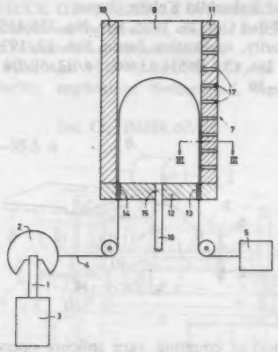
1. A bobbin hanger construction comprising bolt means for mounting at its upper end to a hanger attaching rail, bisected pivot housing means, cap means having an internal recess portion formed therein for receiving said pivot housing means thereinto, said bisected pivot housing means having an internal upper recess therein for receiving the bottom end of said bolt means thereinto, said pivot housing having an internal lower recess at its bottom end thereof, a bearing pivot element having its upper end thereof positioned within the internal lower recess of said pivot housing, a bisected rotary bearing member having an internal upper recess portion in the top portion thereof receiving the bottom end of said pivot element therein, the upper free end surface of said rotary bearing member having a top recess therein, said pivot housing means having a bearing hemisphere at its bottom end thereof positioned in the top recess of said rotary bearing member and a rotary housing member mounted on the body of said rotary bearing member in encircling relationship forming a vertical suspension element thereby for receiving a bobbin therein.

4,052,022

WINDING DEVICE

Johannes Martinus Reijnhard, Tilburg, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 23, 1976, Ser. No. 679,803
Claims priority, application Netherlands, May 6, 1975, 7505279
Int. Cl.² B65H *59/10*, *77/00*
U.S. Cl. 242—147 A **5 Claims**



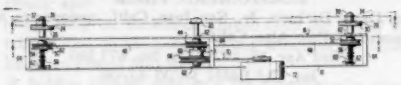
1. A wire tension device for winding wire, comprising two plates having flat inner surfaces arranged parallel and at a fixed distance from each other, defining a gap therebetween; side strips between and connecting said plates; and an end closing member connected to said plates and said side strips, said member having an inlet opening and an outlet opening for passage of wire therethrough, and means for passing a flow of compressed gas through said closing member into said gap, wherein at least a portion of one of said strips is permeable to a flow of gas therethrough whereby wire passing through said device is subjected to friction against said one of said strips.

4,052,023

FILM EDITOR

Carl R. Schultz, 2802 Maryland Ave., Baltimore, Md. 21218

Filed June 3, 1976, Ser. No. 692,397
Int. Cl.² G03B *1/04*; G11B *15/32*
U.S. Cl. 242—180 **13 Claims**



4. A film editor comprising a film transport, said film transport comprising:

a. two parallel plates;

b. a central spindle rotatably mounted on said parallel plates and extending outwardly thereof;

c. a film sprocket fixedly mounted on said central spindle outside said parallel plates;

d. two outer spindles rotatably mounted on said parallel plates and extending outwardly thereof on the same side as said central spindle;

e. two pairs of flanges one of which is mounted on each of said outer spindles outside said parallel plates, one of each pair of flanges being arranged to support a reel or turntable on which film may be supported in co-operation with said film sprocket and being freely mounted on its respective spindle and the other of each pair of flanges being rigidly attached to its respective spindle, each of said pairs of flanges being in facing, frictional contact; and

f. first means for driving said central spindle and said outer spindles so that, when it is desired to have film move

towards a particular one of said outer spindles, that outer spindle is caused to turn and the other outer spindle is prevented from turning, said first means comprising:

ii. a first pulley rigidly attached to said central spindle between said plates;

ii. second and third pulleys one of which is freely mounted on each of said outer spindles between said plates and in position to co-operate with said first pulley;

iii. two one-way clutches, one of which is mounted on each of said outer spindles and attached to one of said second and third pulleys;

iv. two further one-way clutches, one of which is mounted on each of said outer spindles and attached to one of said plates; and

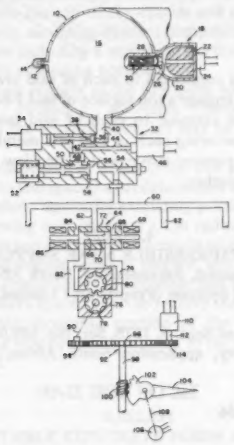
v. second means for rotating one of said spindles.

4,052,024

PNEUMATIC GEAR MOTOR APPLICATION

James M. Smith, Fanibel Island, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 12, 1976, Ser. No. 685,553
Int. Cl.[2] F15C *3/12*; F41G *7/00*
U.S. Cl. 244—3.21 **6 Claims**



1. A pneumatic device comprising a source of pneumatic gas supply, means supplying said gas at a predetermined pressure to a manifold, servo valve means connected to said manifold for receiving said gas at said predetermined pressure and connected to a pneumatic gear motor for supplying and exhausting said gas to and from said pneumatic gear motor, a gear of said pneumatic gear motor being connected to reduction gearing that is driven by said pneumatic gear motor, and said reduction gearing being connected for driving a control fin and a position feedback potentiometer to indicate the position of the control fin.

4,052,025

SEMI-BUOYANT AIRCRAFT

Frank M. Clark, 707 W. Carrillo, Santa Barbara, Calif. 91301, and George M. Christner, 6277 Westmorland Place, Goleta, Calif. 93017

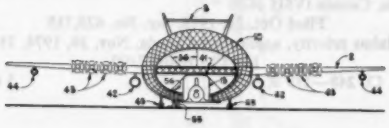
Filed Apr. 3, 1975, Ser. No. 564,853
Int. Cl.[2] B64B *1/08, 1/20*
U.S. Cl. 244—25 **3 Claims**

1. An aircraft structure including a fuselage shaped to provide substantial aerodynamic lift in an airstream with a minimum of aerodynamic drag,

the fuselage including a rigid external framework formed by a web of tension members longitudinally extending about the fuselage in a relatively helical pattern,

the fuselage also including a central longitudinal channel extending internally of said framework along the lower portion of the fuselage substantially the entire length thereof for reinforcing the fuselage and defining an area for receiving cargo,

the fuselage further including a bouyant envelope contained within the rigid external framework and pressurized to bear on and reinforce the external framework, the bouyant envelope being of a volume defined by the rigid external framework, the pressure of the gas enclosed in the envelope increasing as the air pressure about the aircraft decreases to exert a force upon and further reinforce the rigid external framework as the aircraft rises to operational altitudes and speeds,



a pair of wings attached to the fuselage in an opposed relationship and shaped to provide substantial aerodynamic lift in an airstream with a minimum of aerodynamic drag, the aerodynamic lift provided by the fuselage and the wings, together with the bouyancy provided by the bouyant envelope, being sufficient to maintain the aircraft airborne when in forward motion in an airstream,

power means to impart forward motion to the aircraft, and

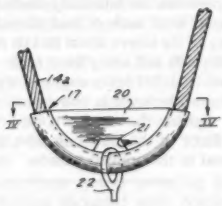
sets of landing gear affixed to the fuselage at the forward, central and rearward portions of the aircraft, the landing gear sets being independently retractable and steerable permitting one end set of landing gear to be at least partially retracted and the aircraft turned on the central and other end set of landing gear when at rest turned on the central and other end set of landing gear when at rest upon the ground.

4,052,026

LOAD SUSPENSION EQUALIZING THIMBLE

Roger D. Wood, Harrisburg, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.

Filed May 24, 1976, Ser. No. 689,254
Int. Cl.[2] B64B *1/22*
U.S. Cl. 244—127 **9 Claims**



1. A thermal hot air airship comprising in combination:

an elongate aerodynamic shaped hot air retaining envelope of a flexible material;

hot air pressure generating means carried on the envelope for pressurizing the envelope with heated air for supplying substantially the entire lift force during flight;

tail members at the aft end of the envelope;

a gondola carried beneath the envelope;

a power operated propeller means on the gondola for driving the airship in horizontal flight;

a plurality of suspension cables each cable having ends se-

cured to the gas envelope on each side adjacent the top of the envelope, the suspension cables being spaced from each other from the fore to the aft end of the airship and each cable being looped laterally in free hanging fashion downwardly beneath the envelope;

a thimble means on each of the cables beneath the envelope for sliding on each cable at the bottom thereof for equally distributing the vertical load through the suspension cables to each side of the envelope;

and means securing the gondola to the thimble means to be suspended therebeneath.

4,052,027

METHOD AND MEANS FOR SECURING RAILROAD CARS TO A BARGE DECK

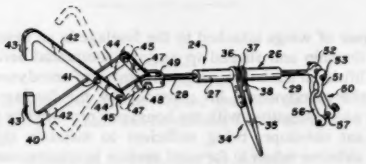
Edward R. Taylor, #6-6750 Dow Ave., Burnaby, British Columbia, Canada (V5H 3G9)

Filed Oct. 24, 1975, Ser. No. 625,715

Claims priority, application Canada, Nov. 28, 1974, 214847

Int. Cl.[2] B60P *7/00*

U.S. Cl. 248—119 R **3 Claims**



1. A tie-down device particularly adapted for use in securing a corner of a railroad car to a supporting surface having anchor members alongside the rails on which the car is adapted to roll, comprising:

a pair of clamping arms pivotally connected together intermediate their ends, having clamping jaws at their outer ends which are turned towards each other, and each clamping arm pivotally connected at its inner end to a lever arm, said lever arms being shorter than said clamping arms and being pivotally connected to each other and to one end of a rod means, said pair of clamping arms being pivotally connected together by a pivot means located nearer to its inner ends than its outer ends, the opposite end of said rod means including securing means for releasably connecting that end to an anchor member,

said rod means including a tension applying means along its length including a pair of aligned and separate oppositely threaded portions, an internally threaded sleeve threadedly engaged with both of said threaded portions, such that turning of the sleeve about its axis moves the threaded portions towards and away from each other, and a manually operated ratchet lever engaged with the sleeve such that turning of the lever in one direction shortens the rod means to tighten the tie-down device and to apply a clamping force of the clamping jaws towards each other proportional to the applied tension.

4,052,028

STRUCTURAL STEELWORKER'S SAFETY CLAMP

Jose Cordero, Jr., 1647 Sweetwood Drive, Daly City, Calif. 94105

Filed July 6, 1976, Ser. No. 702,644

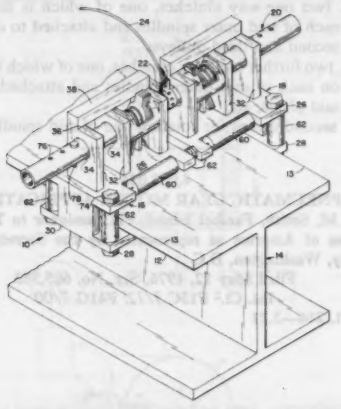
Int. Cl.[2] E04G *17/18*; F21S *1/02*; B66D *3/00*

U.S. Cl. 248—228 **6 Claims**

1. A safety clamp adapted to be slidably attached to an I-beam for providing a connection to which one end of a workman's lifeline may be attached, said clamp comprising:

an elongate bar member adapted to extend transverse said I-beam;

a pair of jaw members slidably coupled to said bar member, each of said jaw members including opposed inner portions having U-shaped indentations adapted to receive a flange of said beam, at least one of said jaw members having a plate member that defines a leg of said U-shaped indentation of said one jaw member, said plate member being rotatably attached to said one jaw member for rotation in a plane parallel to and underlying said flange;



bearing means connected to each of said jaw members and disposed to engage a top surface of said I-beam flange; and

locking means coupled to each of said jaw members for releasably securing each of said jaw members of said bar member to prevent movement of said jaw members away from one another.

4,052,029

COMPRESSIBLE MINE SUPPORT

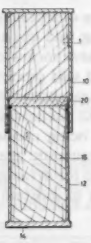
Rodney C. Townsend, Johannesburg, South Africa, assignor to Mine Support Systems (Proprietary) Limited, Johannesburg, South Africa

Filed Sept. 3, 1975, Ser. No. 609,951

Claims priority, application South Africa, Sept. 5, 1974, 74/5649

Int. Cl.[2] E04G *25/00*

U.S. Cl. 248—356 **2 Claims**



1. A compressible load absorbing mine support including a timber load-resisting element, a first sleeve of ductile mild steel surrounding said element completely in a direction transverse to its grain and extending beyond one end of the element to form a socket, a plunger consisting of a second timber element completely surrounded by a second sleeve of ductile mild steel, said plunger extending into said socket, said first and second sleeves being yieldable and deformable under significant loading so as to collapse without rupture, so that an increasing load applied across the support in the axial direction of said sleeves will cause the plunger to move telescopically into said first

sleeve to crush the timber elements while the ductile sleeve yieldably constrain the timber against expansion in a direction transverse to its grain.

4,052,030

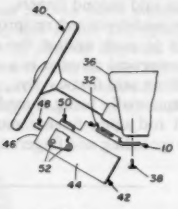
SLIDE-IN MOUNTING BRACKET FOR CB RADIOS

Billy J. Wright, Rte. 2, Box 279A, Wichita Falls, Tex. 76301

Filed Apr. 12, 1976, Ser. No. 676,112

Int. Cl.[2] F16M *13/00*

U.S. Cl. 248—359 **7 Claims**



1. For use in conjunction with CB radios of the type having a chassis and a mounting bracket of predetermined thickness extending over the top of the chassis and spaced apart therefrom, a slide-in mounting bracket comprising:

a first place including a mounting portion and an angularly upwardly extending portion;

the mounting portion of the first plate having a plurality of fastener receiving apertures formed therethrough whereby the mounting bracket may be secured on a vehicle;

a second plate equal in width to the first plate and extending parallel to and spaced a predetermined distance apart from the angularly upwardly extending portion of the first plate for receiving and retaining a CB radio mounting bracket therebetween and thereby securely retaining the CB radio while facilitating removal thereof; and

a standard comprising a top member and a pair of depending leg members spaced apart to receive the CB radio therebetween, the mounting portion of the first plate of the mounting bracket being secured to the top member of the standard.

4,052,031

ADJUSTABLE CONCRETE FORM APPARATUS

Samuel T. Melfi, 1601 NW. First Court, Boca Raton, Fla. 33432

Continuation-in-part of Ser. No. 600,048, July 29, 1975, abandoned. This application July 26, 1976, Ser. No. 708,566

Int. Cl.[2] E04G *11/06*

U.S. Cl. 249—19 **6 Claims**

1. A form apparatus for constructing a concrete building wall to extend up from the floor of the building at an outside edge of said floor without using scaffolding at the outside of the building, said form apparatus comprising:

an outer vertical form section having a lower end with an inside face for abutting engagement with said outside edge of the floor;

a pair of vertical end form sections at the opposite ends of said outer form section;

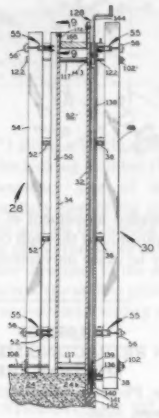
vertical pivot means at each end of said outer form section acting between the latter and the adjacent end form section for pivotal adjustment of each end form section to a position extending inward from said outer form section;

means on said outer form section near the top at each end for operatively connecting the upper end of a respective floor-mounted turnbuckle brace to said outer form section to support the latter from said floor;

elongated screw-threaded rods extending generally horizontally closely above said floor and operatively connected to said outer form section near its lower end, brackets loosely receiving said rods and attachable to said floor, and nuts threadedly engaging said rods at the inner side of said brackets for pulling and holding the lower end of the outer form section tight against the outside edge of the floor;

lower spacer sleeves loosely receiving said rods and extending inward from said outer form section;

a vertical inner form section having upwardly extending slots therein which are open at its bottom edge to slip freely over said rods at the inner end of said lower spacer sleeves;



nuts threadedly mounted on said rods outward from said brackets for holding the lower end of said inner form section against the respective inner ends of said lower spacer sleeves;

tie rods connecting said inner form section to said outer form section near their upper ends;

and means operatively associated with said end form sections for releasably locking said end form sections to said inner form section with said end form sections extending inward from said outer form section.

4,052,032

EXTERIOR FORM SPREADER SYSTEM FOR THREADED END CONCRETE TIES

Peter R. Lovisa, 1040 Pelhamdale Ave., Pelham Manor, N.Y. 10803; Dusan Tausanovitch, 24 Crestwood Drive, Northport, N.Y. 11768, and Tullio E. Lovisa, 91 Whitson Road, Huntington, L.I., N.Y. 11743

Division of Ser. No. 525,887, Nov. 21, 1974, Pat. No. 3,920,214. This application Nov. 6, 1975, Ser. No. 629,369

The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.

Int. Cl.[2] F04E *11/06, 17/06;* **F16B** *37/00*

U.S. Cl. 249—40 **5 Claims**

1. In a concrete form system including spaced wall forms and a tie rod having threaded ends cooperating with said forms, the combination of

a. nut means internally threaded for engagement with the adjacent end of said tie rod,

b. said nut means having a groove in the side thereof providing a pair of spaced opposed circumferential shoulders,

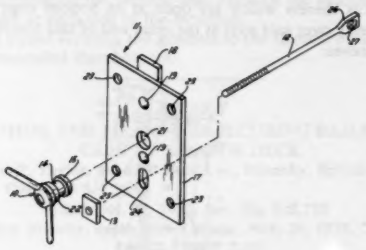
c. a plate washer assembly including a plate having a through hole receiving the axially inner of said shoulders therethrough,

d. means securing said plate assembly to the exterior of one of said forms with the end of said tie rod projecting through said hole,

e. said nut means being threaded on said tie rod to a position

wherein said inner shoulder thereon projects through said hole,

f. and said assembly including means movable thereon with respect to said through hole into releasable engagement within said groove establishing a driving relation between said shoulders and said assembly,



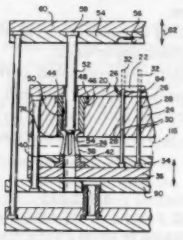
g. whereby threaded movement of said nut means on a tie rod will be transmitted through one of said shoulders and said assembly to cause movement of said form axially of said tie rod.

4,052,033

EJECTOR PIN RETRACTING MEANS FOR PLASTIC MOLDING DIES

William L. Taylor, Phoenix, Ariz., assignor to Pixley Richards West, Inc., Tempe, Ariz.

Filed Sept. 29, 1976, Ser. No. 727,301
Int. Cl.[2] G05G *5/08*; B29C *7/00*; B29F *1/14*
U.S. Cl. 249—67 **5 Claims**



1. A molding die employing an ejector pin retracting mechanism comprising:

a first die member having a first molding cavity,

a reciprocally operable member,

an ejector pin mounted on said reciprocally operable member for movement into and out of said first molding cavity,

a second die member having a second molding cavity,

means for moving said first and second die members one relative to the other so as to open and close the first and second cavities,

a return rod fixedly mounted on said second die member,

a hollow cylindrical sleeve member defining a first bore extending therethrough fixedly mounted on said die adjacent said first die member,

said rod being aligned concentrically with said first bore for reciprocal movement therein,

a hollow tubular ejector pin return and detent means defining a second bore extending therethrough and having first and second ends,

said detent means being connected to said pin carrying member in axial alignment with said first bore and having a plurality of spaced resilient fingers disposed around said first end of said second bore and biased toward each other,

said fingers defining therebetween a circular cross-sectional configuration the diameter of which is slightly less than the diameter of said rod,

the diameter of said second bore at its second end being larger than the diameter of said rod,

said rod when forced between said fingers spreads them apart a distance greater than the diameter of said first bore and when moved from a position between said fingers into said first bore causes said ejector pin carrying member to move said ejector pin into said first molding cavity,

said fingers when biased toward each other enough to cause them to enter said first bore prevents said return rod when said fingers are in said first bore from entering said second bore between said second fingers,

whereby upon predetermined reciprocal movement of said rod causes it to push against the end of said fingers to move said reciprocal member in a direction to move said ejector pin from said first cavity,

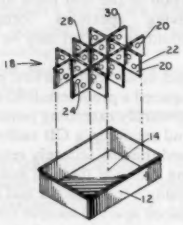
said fingers sequentially being forced out of said first bore causing said rod upon further movement to enter said second bore spreading said fingers apart and passing therebetween.

4,052,034

BAKING DEVICE

Josephine Marceno, 2719 Paulding Ave., Bronx, N.Y. 10469

Filed Dec. 4, 1975, Ser. No. 637,731
Int. Cl.[2] A21C *9/06*
U.S. Cl. 249—110 **7 Claims**



1. A baking pan including side walls and a bottom, a partition strip dividing the pan into discrete baking compartments comprising a plurality of opposing and intersecting walled members removably seated in said pan on said bottom between said side walls, each of said members having a wall and a top portion and defining at least one through aperture on its wall, said aperture communicating with two of said baking compartments, each of said members including a substantially centrally disposed channel in fluid communication with said aperture, said channel including one inlet port disposed on the top portion of said wall member in communication with said aperture, said inlet port being of such size to receive a quantity of cake filling, which can travel through said channel and exit through said aperture into dough disposed between said walled members.

4,052,035

REMOTELY-CONTROLLED VALVE

Shaun S. Kenny, and Leonard J. Armstrong, both of Staten Island, N.Y., assignors to Conservocon, Inc., Staten Island, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,797
Int. Cl.[2] F16K *31/143*; F16L *27/04*
U.S. Cl. 251—14 **5 Claims**

1. A remotely-controlled valve attachable to the spout of a faucet for the control of water flowing therethrough comprising:

a foot operated control member,

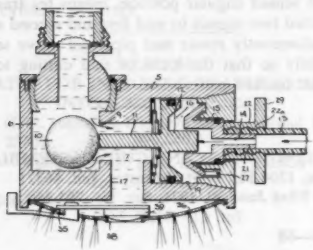
a control valve member having adapting means to attach it to a faucet, said valve member having a body enclosing a

first chamber for accepting water from said faucet from a water inlet passage and a second chamber having a passage for directing exiting water from said control valve member, said first and second chambers being connected by means of an aperture, said first chamber having a valve ball placed within it, said valve ball being urged, by the force of water entering said first chamber from said faucet, against said aperture thereby preventing water flow from said first chamber to said second chamber, said control valve member connected to said foot-operated control member by means of a flexible conduit, said foot-operated control member, upon activation, applying fluid under pressure through said flexible conduit,

a cylinder within said control valve member,

a piston slidably disposed within said cylinder,

a piston guide chamber slidably disposed within said chamber having attached thereto an inlet member about which said flexible conduit is connected, said inlet member having a hollow passage for fluid or air under pressure from said foot-operated control member,



the flexible conduit connected to the end of said inlet member transmitting the fluid pressure therein to the end of the piston thereby causing said piston to slide within said cylinder in the direction of said valve ball, the actuating rod attached to said piston thereby moving said valve ball away from said aperture and allowing water to flow from said first chamber to said second chamber, and

means for manually urging said piston and its rigidly attached rod against said valve ball thereby moving said valve ball away from said aperture and allowing water to flow from said first chamber to said second chamber, said manual urging means comprising a clamp extending about the exterior of the flexible conduit adjacent to the end of the inlet member of the piston guide for retaining the conduit to the inlet member, and an override thumb ring attached to the clamp, said piston guide chamber undergoing linear movement with respect to said valve body by means of manual force applied to said override thumb ring, said linear movement being transmitted from said piston guide to said piston and its rigidly attached rod to said valve ball.

4,052,036

SLIDING DEVICE FOR THE GAS-TIGHT AND AIR-TIGHT CLOSURE OF A CONTAINER OPENING OR OF A CONDUIT

Siegfried Schertler, Haag, Switzerland, assignor to Vat Aktiengesellschaft fur vakuum-apparate-technik, Haag, Switzerland

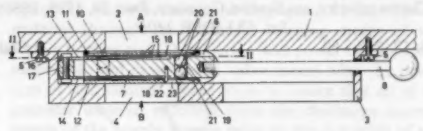
Filed July 15, 1975, Ser. No. 596,121

Claims priority, application Switzerland, July 15, 1974, 9738/74

Int. Cl.² F16K *51/00*

U.S. Cl. 251—144 **21 Claims**

1. A sliding device for the gas-tight and air-tight closure of an opening of given size in a body, said sliding device comprising a thick locking member (**7;7';7''**) which is displaceable by means of a push rod (**8**) and which comprises a deflectable sealing plate (**10;10';10''**) having a counter element (**12; 12';12''**) connected therewith by means of a spring member (**13,14,35**) wherein the locking member (**7;7';7''**) contains ball spreading elements (**20**) which rest against the sealing plate (**10;10';10''**) and the counter element (**12;12';12''**) to spread apart the sealing plate (**10;10';10''**) and the counter element (**12;12';12''**) when the locking member (**7;7';7''**) has been moved into the closing position and to press the sealing plate (**10;10';10''**) onto a seat of the body in a seal-tight manner through the intermediary of a narrow annular seat packing (**11;11';11:**), characterized in that a plurality of the spreading elements (**20**) are disposed in the



locking member (**7;7';7''**) along a single closed line which, in the closing position of the locking member (**7;7';7''**), is located between the inner boundary line of the seat packing (**11;11';11''**) and the boundary line of the opening (**2,4**) such that fluid pressure which acts on the sealing plate (**10;10';10''**) within the enclosed area of the spreading elements and which is directed in the opposite direction to the sealing pressure at the seat to effect deflection of the sealing plate in the manner of a lever arm to produce an increased sealing pressure upon the seat packing.

4,052,037

DRINKING CUP STRUCTURED TO ENHANCE BEVERAGE BLENDING

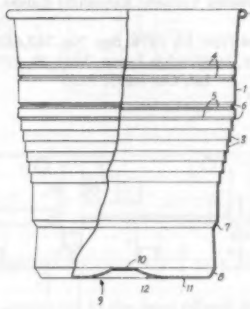
Barrie Mair, Maidenhead, and Bernard Roy Schumann, Reading, both of England, assignors to Mars Limited, Slough, England

Filed May 22, 1973, Ser. No. 362,673

Claims priority, application United Kingdom, May 26, 1972, 25080/72

Int. Cl. B01f *1/00*; B65d *3/06, 21/02*

U.S. Cl. 366—341 **2 Claims**



1. A drinking cup adapted to facilitate the blending of a liquid with a charge of dry beverage ingredients stored in the bottom of the cup, the said cup being of the type having a general frustoconical side wall and a bottom wall joined to said side wall integrally therewith, the improvement characterized by the bottom wall having a relatively flat raised central area and a generally annular area extending outwardly from said central area to said side wall, said annular area having an upwardly concave cuspidal conical portion contiguous to and extending outwardly and downwardly from said central area and a flat portion merging with said concave portion and extending outwardly therefrom to a juncture with the said side wall, the juncture being formed as an annular shoulder flaring

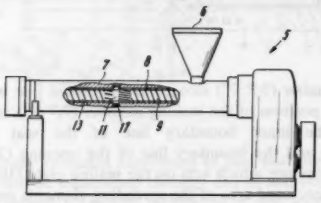
outwardly and upwardly to join the bottom and side walls at obtuse angles therewith.

4,052,038

SCREW EXTRUDER FOR THERMOPLASTICS SYNTHETIC MATERIALS OR ELASTOMERS

Wilhelm Brand, Hannover, Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hannover-Kleefeld, Germany

Filed Dec. 8, 1976, Ser. No. 748,565
Claims priority, application Germany, Dec. 24, 1975, 2558638
Int. Cl.² B29B *1/06*
U.S. Cl. 366—90 **3 Claims**



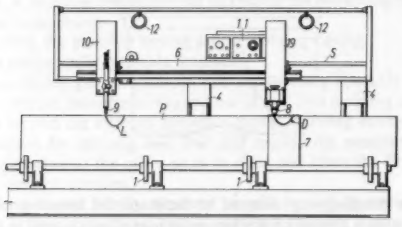
1. A screw extruder for thermoplastics synthetic materials or elastomers having a screw rotating in a cylinder wherein the screw has a mixing part having a plurality of first grooves at an upstream position thereof inclined in the direction of feed, a plurality of second grooves at a position downstream of the first grooves and also inclined in the direction of feed and a grooveless portion between said first grooves and said second grooves, and the cylinder has a mixing part which surrounds said grooveless portion of the mixing part of the screw and has third grooves therein which extend axially or are inclined in the direction of feed, the number of said first grooves, said third grooves and said second grooves differing.

4,052,039

AUTOMATIC CUTTING TORCH ASSEMBLY

Nobushige Koyano, Kanagawa, and Katsumi Inamori, Aichi, both of Japan, assignors to Iwatani Sangyo Kabushiki Kaisha, Osaka and Seimitsu Yodanki Kabushiki Kaisha, Tokyo, both of Japan

Filed Nov. 17, 1976, Ser. No. 742,641
Claims priority, application Japan, May 19, 1976, 51-64146
Int. Cl.² B23K *7/10*
U.S. Cl. 266—57 **1 Claim**



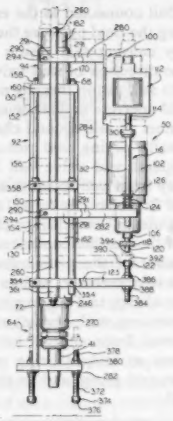
1. An automatic cutting torch assembly for making a cut of any predetermined shape in a metallic pipe upon which a pattern line has been superimposed which is a replica of said predetermined shape, comprising, frame means, first and second shafts rotatably mounted on said frame means in transversely spaced relation, disk means attached to said shafts at spaced apart points longutidinally thereof for supporting said pipe, a first servomotor mounted on said frame means in driving relation to one of said shafts for rotating said pipe in either selected direction, longitudinally extending rail means mounted on said frame means in parallel relation to said pipe, a beam member mounted on said rail means for movement relative thereto and parallel to said pipe, a second servomotor mounted on said frame means in driving relation to said beam member for moving said beam member in either selected direction, a rotatable photoelectric tracer unit for sensing and tracking said pattern line mounted on said beam member for rotation about an axis which is perpendicular to and intersects the horizontal axis of said pipe, a third servomotor carried by said beam member and being responsive to conditions sensed by said tracer unit, said third servomotor being in driving relation with said tracer unit for rotating said tracer unit in either selected direction to perform said tracking, a cutting torch unit mounted on said beam member and directed towards said pipe so that the axis thereof is parallel to the axis of said tracer unit and intersects the axis of said pipe, at least one of said units being adjustably positioned on said beam member so that the distance between said units may be selected during set-up, a resolver unit for sensing the instantaneous angular position of said tracer unit and translating the second signal into two signals which correspond to circumferential and axial components of said sensed angular position, means for transmitting said transmitted two signals to said first and second servomotors to simultaneously rotate said pipe and move said beam member axially so that the locus of said cutting torch is a replica of said tracked pattern line.

4,052,040

CUTTING TORCH AND GUIDE ASSEMBLY

Ralph Ogden, 1304 Fisher St., Munster, Ind. 46321

Filed June 30, 1976, Ser. No. 701,368
Int. Cl.² B23K *7/10*
U.S. Cl. 266—68 **8 Claims**



1. In a cutting apparatus comprising a cutting torch mounted on a wheeled frame riding on a trackway for torch cutting of a work piece positioned for torch cutting along the path of movement of the frame and means for moving the frame along the trackway, the improvement wherein said torch comprises:

a cylinder structure including means for mounting same in a vertical position on the frame,

a torch body mounted in said cylinder structure for reciprocating movement axially and vertically of said cylinder structure and including a nozzle at the lower end of said torch body,

a sensing device carried by said torch and comprising:

a feeler member having a plurality of feelers disposed in uniformly spaced apart relation about said nozzle,

said feeler member being mounted for a lost motion movement range axially of said cylinder structure relative to said nozzle,

and hydraulic means for supporting said torch body from said cylinder structure and for moving same axially of said cylinder structure,

said hydraulic means including a hydraulic system for positioning said torch body relative to said cylinder structure to dispose said nozzle at a predetermined spacing above the work piece with said feelers resting on the work piece and said feeler member disposed in its said lost motion range to provide the operative position of said torch body for torch cutting purposes,

and means for translating movement of said feeler member in its said lost motion range due to elevational changes in the work piece into adjustment of said flow orienting means to maintain said nozzle at said spacing above the work piece, on movement of the frame along the trackway for torch cutting purposes,

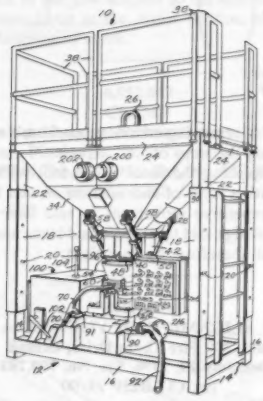
said cylinder structure and said torch body comprising a hydraulic cylinder and piston device forming a part of said hydraulic means with said cylinder and piston device being connected in double acting relation in said hydraulic system for said positioning of said torch body relative to said cylinder structure.

4,052,041

APPARATUS FOR INJECTING GRANULAR MATERIAL INTO A MOLTEN METAL

Gerald F. H. H. vonStroh, III, 2976 Staunton Road, Huntington, W. Va. 25702

Filed Dec. 15, 1976, Ser. No. 750,633
Int. Cl.[2] C21C 7/00
U.S. Cl. 266—81 **25 Claims**



1. Apparatus for injecting a predetermined amount of a free flowing granular material into a body of molten metal or the like comprising:

a supply hopper for receiving a supply of granular material, said supply hopper having discharge opening means therein,

means for controlling the flow of granular material received within said supply hopper outwardly through said discharge opening means,

means for receiving the granular material flowing outwardly from the discharge opening means of said supply hopper under the control of said control means and feeding the same to an incremental volume forming position,

means defining a confined flow path for the flow of air under pressure into a granular material entraining position and for the flow of air under pressure with granular material entrained therein from said granular material entraining position to a discharge end, the discharge end of said flow path defining means comprising a lance for the body of molten metal,

valve means in said confined flow path upstream of said granular material entraining position for controlling the flow of air under pressure through said confined flow path,

power operated means for transferring successive incremental volumes of granular material from said incremental volume forming position to said granular material entraining position, and

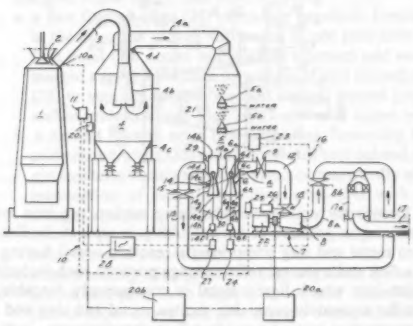
means for sensing a condition indicative of the flow of a predetermined amount of granular material through the discharge opening means of said supply hopper and for (1) operating said control means to prevent further flow of material through the discharge opening means of said supply hopper and (2) rendering said power driven means inoperable and closing said valve means after the operation of said control means so as to insure that all of the granular material received from the discharge opening means of the supply hopper prior to the operation of said control means is fed to said incremental volume forming position, transferred to said granular material entraining position, entrained within the air under pressure flowing in said confined path and discharged therewith through said lance into the body of molten metal.

4,052,042

APPARATUS FOR CLEANING BLAST-FURNACE EXHAUST GASES

Karl-Rudolf Hegemann, Essen-Bergerhausen; Gunther Finger, Wesel; Albert Brinkmann, Duisburg, and Helmut Weissert, Hamm, all of Germany, assignors to Gottfried Bischoff Bau kompl. Gasreinigungs-und Wasserruckkuhlungs-Anlagen Kommanditengesellschaft, Essen, Germany

Filed May 21, 1976, Ser. No. 688,893
Claims priority, application Germany, May 24, 1975, 2523083; May 24, 1975, 2523082
Int. Cl.[2] C21B 7/22
U.S. Cl. 266—89 **19 Claims**



1. A gas-cleaning apparatus for a high-pressure furnace comprising:

duct means connected to the head of said furnace for conducting an exhaust gas therefrom, the head of said furnace having a back pressure;

a separator connected to said duct means for separating dust from said exhaust gas;

a differential-pressure washer having an upstream side connected to said separator and receiving said exhaust gas therefrom;

a main conduit connected to a downstream side of said washer;

an expansion turbine unit connected to said main conduit for expanding gas traversing same, said differential-pressure washer being located ahead of said expansion turbine unit and washing gas from said duct means prior to the passage of the gas through said expansion turbine unit;

a bypass conduit connected to said differential-pressure

washer for conducting gas therefrom around said expansion turbine unit;

a quick-opening valve in said bypass conduit and a quick-closing valve in said main conduit for substantially concurrent operation to switch over flow of gas from said main conduit to said bypass conduit;

means connected to said quick-opening and quick-closing valves fo simultaneously operating same;

a pressure-control valve connected to said bypass conduit for regulating flow therethrough; and

control means connected to the head of said furnace and responsive to the pressure at the head of said furnace and connected to said expansion turbine unit and to said pressure-control valve for operating said unit when said main conduit is traversed by gas and operating said pressure-control valve when said bypass conduit is traversed by gas to maintain said back pressure substantially constant.

4,052,043

APPARATUS FOR CONTINUOUSLY REFINING MOLTEN METALS

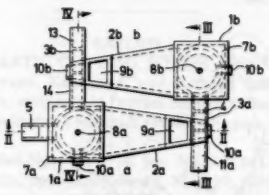
Paul Rheinländer; Gustav Mahu, both of Wolfenbuttel, Germany; Klaus Schulz, deceased, late of Wolfenbuttel, Germany, by Ingrid Rühland, legal representative for Jörg Schulz, sole heir, Braunschweig, Germany, and Klaus Berner, Salzgitter-Lebenstedt, Germany, assignors to Stahlwerke Peine-Salzgitter Ag, Peine, Germany

Division of Ser. No. 575,174, May 4, 1975, Pat. No. 3,985,549, which is a continuation-in-part of Ser. No. 825,643, May 19, 1969, abandoned, and Ser. No. 335,812, Feb. 26, 1973, abandoned, which is a continuation of Ser. No. 46,687, June 16, 1970, abandoned. This application June 30, 1976, Ser. No. 701,217

Claims priority, application Germany, June 18, 1969, 1930746

Int. Cl.² C21C *7/10*

U.S. Cl. 266—207 **14 Claims**



1. Device for continuously refining molten pig iron with oxygen and an addition of lime resulting in separate bodies of molten metal and slag comprising a reaction vessel having at least a first and a second refining stage portions each including an inlet into which liquid metal is continuously feedable, a outlet for separately removing molten metal and slag and an interconnecting section providing flow therebetween, each of said first and second refining stage portions forming a passage from the inlet through the interconnecting section to the outlet having a lower liquid level defining the upper level of the molten metal

and an upper liquid level defining the upper level of a layer of slag with the layer of slag located between the lower liquid level and the upper liquid level, means providing communication between said refining stage portions including a slag duct for passing out of the outlet of said second refining stage portion and into the inlet of said first refining stage portion at least part of the layer of slag therein, said slag duct having one end opening into said first refining stage portion and another end opening into said second refining stage portion at an elevation thereof higher than at which said one end opens into said first refining stage portion, at least one gas supply tube communicating with each of said first and second refining stage portions, and means for discharging slag and liquid metal from said reaction vessel, said discharge means comprising openings spaced vertically from one another with one of said openings located in said first refining stage portions and the other said opening located in said second refining stage portion.

4,052,044

METHOD OF AND APPARATUS FOR THE DECRUSTING OF METALLURGICAL LANCES

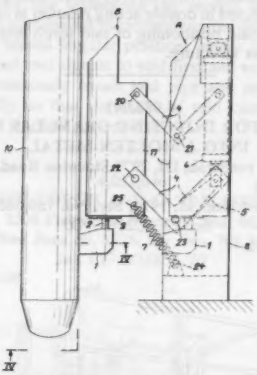
Joseph Colling, Luxembourg; Carlo Heintz, and Alfred Unbekand, both of Kayl, all of Luxembourg, assignors to ARBED - Acieries Reunies de Burbach-Eich-Dudelange, Luxembourg, Luxembourg

Filed Nov. 19, 1976, Ser. No. 743,520

Claims priority, application Luxembourg, Nov. 21, 1975, 73846

Int. Cl.² C21C *7/00*

U.S. Cl. 266—225 **22 Claims**



1. A method of removing encrustations from a metallurgical lance comprising the steps of:

relatively displacing the lance and a tool with the tool in contact with a layer of encrustation on said lance; and

applying a repetitive movement to said tool against said layer to dislodge said layer from said lance and permit said layer to fall therefrom by its weight.

4,052,045

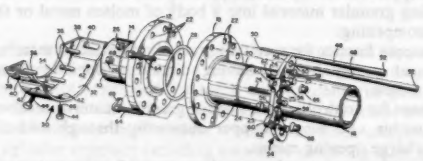
ALIGNMENT OF FLANGES

Billy Joe Shaddix, 309 Fire Thorn Drive, Gretna, La. 70053

Filed July 29, 1976, Ser. No. 709,783

Int. Cl.² B23P *19/00*

U.S. Cl. 269—43 **12 Claims**



1. Flange alignment apparatus for aligning first and second flanges each having a series of holes therethrough in a predetermined pattern, the pattern of holes of said second flange being a mirror-image of the pattern of holes of said first flange, the flange alignment apparatus comprising

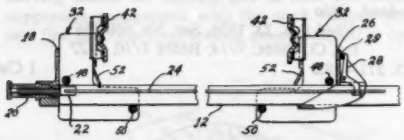
a flange support comprising body means adapted to extend partially around the periphery of said first flange and a plurality of pins projecting from said body means, said pins being disposed in a pattern that matches a portion of said pattern of holes in said first flange and being adapted

to be received in the holes of said pattern portion, said body means including a second flange support portion disposed to engage said second flange when said pins are received in said first flange holes, thereby facilitating alignment of said second flange with said first flange.

4,052,046
JAW ADAPTER FOR A CLAMP

John L. Mortoly, Poughkeepsie, N.Y., assignor to James L. Taylor Mfg. Co., Poughkeepsie, N.Y.

Filed May 27, 1976, Ser. No. 690,520
Int. Cl.² B25B 1/24
U.S. Cl. 269—208 **12 Claims**

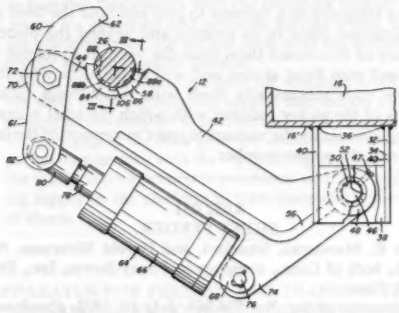


1. A jaw adapter to mount upon the frame of a clamp having relatively movable jaws and increase the effective height of one of the jaws during the clamping of stock between them, the jaw adapter having a front side engageable above the jaws with clamped stock and having a rear side engageable with the face of said one jaw, the jaw adapter including means to contact the frame and facilitate longitudinal movement of the jaw adapter thereon, said means including a member disposed to resist by transversely engaging the frame any tendency of the upper part of the jaw adapter to tilt against said one jaw and concentrate force at the upper portion of said one jaw during the clamping of stock.

4,052,047
CLAMP

Edward A. Bailey, Newport, N.H., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Feb. 12, 1976, Ser. No. 657,508
Int. Cl.² B25B 1/24
U.S. Cl. 269—238 **12 Claims**

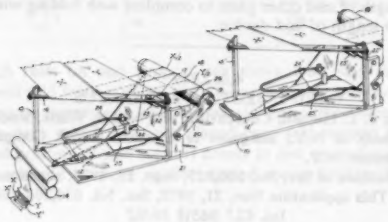


1. In an apparatus for driving an elongated drill steel a drill steel clamping means comprising: support means carried by such an apparatus; jaw means carried by said support means and engageable in clamping engagement with such drill steel; said jaw means comprising at least a pair of relatively movable jaw members with at least one of said jaw members having a formed clamping surface portion engageable with an axially extending formed peripheral portion of such a drill steel; said formed clamping surface portion being comprised of axially spaced alternate land and groove portions and intervening inclined flank portions located axially intermediate said land and groove portions; and said clamping surface portion being engageable with such drill steel in clamping engagement constituted solely of engagement between said inclined flank portions and such formed peripheral portion.

4,052,048
LONGITUDINALLY INTERFOLDING DEVICE AND METHOD

Fumitake Shirasaka, Green Bay, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.

Filed Mar. 11, 1976, Ser. No. 666,224
Int. Cl.² B41L 1/30
U.S. Cl. 270—40 **8 Claims**



1. A method of interfolding elongated webs being advanced along a linear path having longitudinally extending first and second margins, comprising:

lapping a first pair of equal width webs to provide upper and lower webs having a central lapped portion which has longitudinal edges coincident with said margins and unlapped edge portions each one-half the web width outside said margins,

pulling said first pair of webs through a folding device positioned in said path and having transversely aligned first and second folding points **(30, 31)** on said first and second margins respectively, said device having

a. a first folding edge **(24)** extending angularly forwardly in the direction of web movement in said path from said first point **(30)** across said path to intersect said second margin a spaced distance forwardly of said second point **(31)** to support thereabove said central lapped portion and to underfold the edge portion of said upper web,

b. a second folding edge **(36)** extending forwardly from said second point **(31)** coincident with said second margin and terminating a spaced distance rearwardly of the intersection of said first folding edge **(24)** with said second margin to overfold the edge portion of said lower web, said first and second folding edges **(24, 36)** being generally co-planar,

c. a third folding edge **(25)** extending angularly forwardly across said path from slightly above said second point **(31)** to cross above said first margin a spaced distance rearwardly of the intersection of said first folding edge **(24)** with said second margin to complete the overfolding of the edge portion of the lower web prior to completion of the underfolding of the edge portion of said upper web,

pulling a second pair of completely folded webs beneath said device while positioning the overfolded edge portion of the lower web of said second pair in contact with the edge portion of the upper web of said first pair while the same is being folded about said first folding edge whereby the movement of the edge portion of the upper web of said first pair urges and draws the overfolded edge portion of the lower web of said second pair between the edge portion of the upper web of said first pair and the lapped central portion of the lower web of said first pair.

8. An interfolding device adapted to be positioned in the path of travel of a pair of half-lapped webs to fold the same, said path having side margins defined by the lap of said webs, comprising a frame:

said frame being equipped with a turning edge extending transversely of said path to turn said half lapped webs, said turning edge terminating in a pair of points, one on each margin,

said frame including a pair of generally co-planar plates extending forwardly in said path in the direction of web travel, one of said plates being equipped with a side edge coextensive with one of said said margins, the other of said plates being equipped with an angled side edge extending forwardly from the other of said side margins toward said one side margin, said one plate being spaced from said angled side edge to provide a threading throat, and

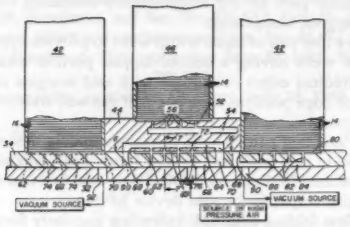
a folding rod on said frame spaced above said plates and extending angularly across said path from said one margin to the other and intersecting said other margin within the length of said other plate to complete web folding within the length of said device.

4,052,049

CARD INJECTING APPARATUS

Stephen J. T. Hassall, Churchville, and Neil S. White, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 506,917, Sept. 17, 1974, abandoned.
This application Nov. 21, 1975, Ser. No. 634,203
Int. Cl.[2] B65H *39/02*
U.S. Cl. 270—58 **3 Claims**



1. In a mechanism for inserting a card under a stack of flat articles, the combination comprising:

a. a pocket having a support surface for supporting a stack of flat articles;

b. means for holding a card adjacent said pocket, said card holding means comprising a stationary member having a flat surface in alignment with said pocket and a movable member slidably supported by said stationary member, said movable member having first and second spaced apart recesses for receiving cards and being selectively movable between a first position in which (1) said first recess is in alignment with said pocket and cooperates with said flat surface to form an enclosed first passageway having a first open end facing said stack and an opposite first closed end and (2) said second recess is in a position to receive a card, and a second position in which (1) said second recess is in alignment with said pocket and cooperates with said flat surface to form an enclosed second passageway having a second open end facing said stack and an opposite second closed end and (2) said first recess is in a position to receive a card;

c. first and second air passages formed by said stationary member and having first and second air passage ends respectively communicating with a selected one of said first and second passageways in said first and second positions respectively of said movable member, one of said first and second air passage ends being positioned adjacent each of said first and second open ends and the other of said first and second air passage ends being positioned between said one of said first and second air passage ends and each of said first and second closed ends, said first and second air passages being inclined relative to a plane in which each of said first and second passageways lie for directing air through each of said first and second open ends toward said pocket support surface; and

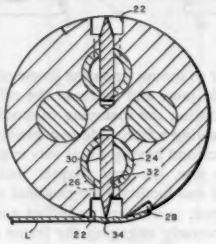
d. means for supporting air under pressure to said first and second air passages whereby air from said first air passage raises said stack above said pocket support surface, and air from said second air passage transports said card in a selected one of said first and second passageways along said pocket support surface to a position under said raised stack.

4,052,050

ROTARY VACUUM PICKER WITH MECHANICAL ASSIST

Sidney T. Carter, Shrewsbury, Mass., assignor to A-T-O Inc., Cleveland, Ohio

Filed Feb. 23, 1976, Ser. No. 660,066
Int. Cl.[2] B65C *9/14;* **B65H** *3/10, 3/22*
U.S. Cl. 271—18.3 **1 Claim**



1. Apparatus for removing labels from a stack of labels comprising a rotatable picker member having a plurality of unyielding cylindrical vacuum picking surfaces concentric with the axis of rotation of said picker member, means supporting the picker member for rotation with its axis parallel to the plane of the endmost label of the stack of labels and at such a distance therefrom that the picking surfaces have tangential engagement with the endmost label, slots in the vacuum picking surfaces of the picker member, means for rotating the picker member to periodically bring the slots into engagement with the endmost label, means for connecting the slots at the place of tangency to a vacuum to grip and hold the label at a predetermined place in its rotation and beyond the place of tangency of disconnect them from the vacuum to release the label, and pins fixed at one end within the slots with their opposite ends substantially flush with the vacuum picking surfaces of the picker member with which the label is drawn into engagement by the vacuum to resist movement of the label relative to the picker member.

4,052,051

SHEET FEEDER

Robert E. Mersereau, Stamford, and Harold Silverman, Norwalk, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Continuation of Ser. No. 594,869, July 10, 1975, abandoned.
This application Aug. 31, 1976, Ser. No. 719,300
Int. Cl.[2] B65H *3/12*
U.S. Cl. 271—94 **10 Claims**

1. Sheet feeding apparatus comprising:

a. means for removing successive top sheets from a stack of sheets, said removing means including feed roller means and vacuum means, the vacuum means operatively connected to the feed roller means for lifting successive top sheets off the stack and into engagement with the feed roller means for transportation thereby away from the stack;

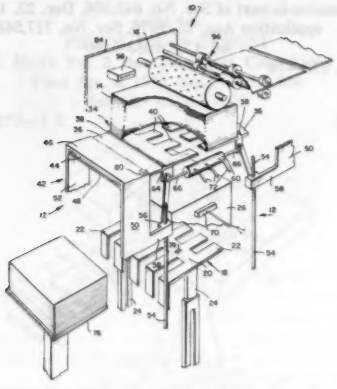
b. primary means for positioning the stack, said primary

positioning means including a platform for supporting the stack thereon and means for moving said platform;

c. first top sheet sensing means for sensing successive top sheets of the stack, said first top sheet sensing means adapted to incrementally operate the platform moving means for elevating the platform to maintain a supply of top sheets of the stack in operative engageable relationship with the removing means;

d. secondary means for positioning the stack, said secondary positioning means including at at least one deck for supporting a reserve portion of the stack and means for moving said at least one deck;

e. means for sensing a first level of the platform, said first platform level sensing means adapted to operate the deck moving means for moving said at least one deck into supporting engagement with the stack reserve portion, said first platform level sensing means adapted to operate



said platform moving means for lowering the platform to a second level to permit loading thereon a replenishing supply of sheets;

f. said first top sheet sensing means adapted to incrementally operate the deck moving means for elevating said at least one deck to maintain the supply of top sheets in operative engageable relationship with the removing means;

g. means for operating said platform moving means to raise the platform from said second level after the replenishing supply has been loaded thereon;

h. second top sheet sensing means for sensing a level of the top sheet of the replenishing supply, said second top sheet sensing means adapted to operate said deck moving means for disengaging the deck from the stack reserve portion to permit engagement with the replenishing supply, whereby the stack reserve portion is combined with the replenishing supply on the platform to form therewith a new stack of sheets.

4,052,052

APPARATUS FOR FEEDING AND TRANSPORTING SIGNATURES IN BOOKBINDING MACHINES

Hans Muller, Zofingen, Switzerland, assignor to Grapha-Holding AG, Hergiswil, Switzerland

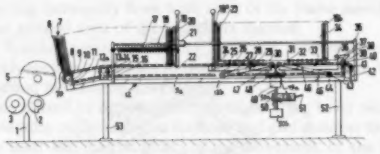
Filed Sept. 1, 1976, Ser. No. 719,578

Claims priority, application Switzerland, Sept. 9, 1975, 11697/75

Int. Cl.² B65H *1/30*

U.S. Cl. 271—157 **11 Claims**

1. In an apparatus for manipulating signatures in a bookbinding machine wherein successive signatures of an expiring stack of signatures are converted into a succession of discrete signatures, a combination comprising conveyor means having a front portion arranged to support and advance an expiring stack of signatures and a substantially horizontal elongated rear portion; a frame; a carriage mounted in said frame in the region of said rear portion and having a substantially horizontal support arranged to carry at least one fresh stack of signatures, said carriage being movable back and forth lengthwise of said rear portion; and means for moving said support with respect to said frame between a raised position in which said support is located at a level above said rear portion and a fresh stack



which rests on said support can move with said carriage toward said front portion, and a lower position in which said support is located at a level below said rear portion whereby a fresh stack which has been placed onto said support in said raised position of said support comes to rest on said rear portion and the carriage can be moved away from said front portion.

4,052,053

STACKER DRUM OF SHEET ACCUMULATING DEVICE

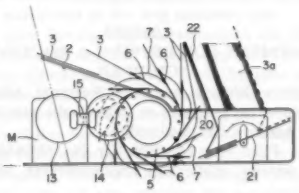
Kaiichi Hasegawa, Kawasaki, and Fumio Sanuga, Inagi, both of Japan, assignors to Fuji Giken Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 17, 1977, Ser. No. 759,975

Claims priority, application Japan, Jan. 28, 1976, 51-7594[U]

Int. Cl.² B65H *29/40*

U.S. Cl. 271—187 **2 Claims**



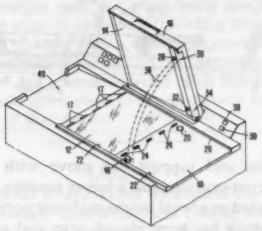
1. In a sheet accumulating device having a stacker drum adapted to rotate about a horizontal axis and having at least one cylindrical drum structure provided around the cylindrical surface thereof with a plurality of blades secured at their inner root parts to the drum structure and extending tangentially in the direction opposite to the circumferential direction of rotation of the drum structure to their outer ends, each blade thereby having an outer leading surface and an opposite, inner trailing surface, sheets such as pieces of paper money fed continuously and successively along a feeding chute being fed into respective spaces between adjacent blades of the rotating stacker drum to be successively upended and accumulated into neat stack, the improvement which comprises a leaf spring secured at an outer end thereof to the outer end of each of said blades on the outer leading surface thereof and extending toward the root part of the adjacent blade in said rotational direction, said leaf spring having a convex curved surface facing, and lightly contacting the inner trailing surface of said adjacent blade, said leaf spring being adapted to reduce the degree of freedom of a sheet fed into the space between the said convex curved surface and said adjacent blade.

4,052,054

SEQUENTIAL LOAD DUAL DOCUMENT FEED

William Richard Cardwell, and Carl Alan Queener, both of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,546
Int. Cl.² B65H 7/02
U.S. Cl. 271—227 **17 Claims**



4. Method for feeding two original documents into a copying machine for simultaneous side-by-side dual document copying, said machine having two modes of operation, a single document copy mode and a dual document copying mode, said method comprising the steps of:

signaling said dual document copy mode;

sequentially placing dual documents on an entry station of the copying machine;

corner registering one of the documents to the first corner in the entry station;

corner registering the second document to a second corner spaced from said first corner such that when the second document is corner registered both documents will be in side-by-side registration relative to each other;

feeding the documents in side-by-side registration from the entry station to a scanning station in the copying machine; and

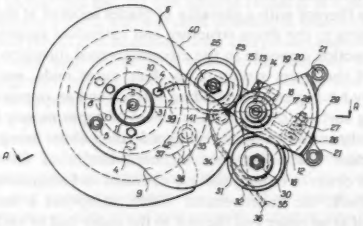
registering the documents at corners of the scanning station.

4,052,055

ARRANGEMENT FOR DRIVING A ROCKING INITIAL GRIPPER

Jaroslav Jiruse, Blansko, and Josef Rozsypal, Adamov, both of Czechoslovakia, assignors to Adamovske strojirny, narodni podnik, Adamov, Czechoslovakia

Filed May 14, 1976, Ser. No. 686,464
Claims priority, application Czechoslovakia, May 29, 1975, 3770/75
Int. Cl.² B41F 1/28; B65H 29/08
U.S. Cl. 271—268 **3 Claims**



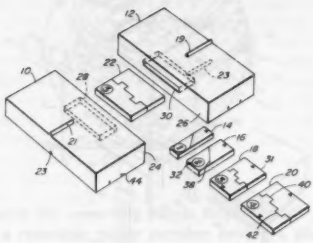
1. An arrangement for driving and controlling the periodic varying motion of a rocking initial gripper relative to the rotational speed of an impression cylinder within a sheet printing machine, where the sheets are fed into the machine for printing by means of chucks of a rocking initial gripper, comprising a driving shaft for the impression cylinder and a shaft for supporting the rocking initial gripper, a control roller, a control lever supporting the control roller fixed on the shaft of the rocking initial gripper, a control cam and a supporting cam fixed by means of a flange on the shaft of the impression cylinder, a supporting roller, a rocking lever supporting the supporting roller supported additionally on the shaft of the rocking initial gripper, the control roller bearing against the control cam and the supporting roller bearing against said supporting cam, the supporting roller maintaining the control roller against said control cam.

4,052,056

REUSABLE KARATE STRIKING BOARD

Robert Friedenthal, 43 Liberty Square Road, Boxboro, Mass. 01719

Continuation-in-part of Ser. No. 643,604, Dec. 22, 1975. This application Aug. 26, 1976, Ser. No. 717,568
Int. Cl.² A63J 5/00
U.S. Cl. 272—76 **4 Claims**



1. A striking board kit comprising first and second substantially rigid parts, said first part and said second part having matched edges and matched concavities in said matched edges, and a plurality of severable insert parts, each insert part having a portion thereof removably insertable in said concavities of said first and second parts to render said matched edges contiguous and temporarily joined along an elongated junction, the strength of each insert part being sufficiently great to require a strike of a predetermined force at said junction to rupture said insert part the construction of each insert part and the removable connection between said insert part and concavities being such that said strike of a predetermined force will necessarily rupture said insert part, said ruptured insert part being removed from said concavities for insertion of another of said plurality of insert parts into said concavities thereby rematching said edges of said first and second parts to once again permit rupture by a predetermined force.

4,052,057

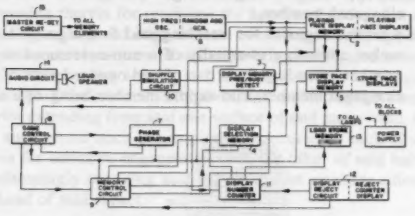
ELECTRONIC AMUSEMENT MACHINE

Trevor William Castle, 10 Thornton St., Eltham, 3095, Australia

Filed Aug. 20, 1975, Ser. No. 606,078
Claims priority, application Australia, Aug. 20, 1974, 8591/74
Int. Cl.² A63F 1/00
U.S. Cl. 273—1 E **8 Claims**

1. An electronic amusement machine including a visual display having at least two sets of individual characters, the characters of each set corresponding to the characters of the other of said at least two sets, one of said sets being a playing set and the other of said at least two sets being a storage set, said machine including first circuit means to randomly illuminate a predetermined number of characters of said playing set

during successive plays of a game and second circuit means to transfer the result of completed plays on said playing set to said



storage set, and means for storing said results at least until the last play is completed on said playing set.

4,052,058

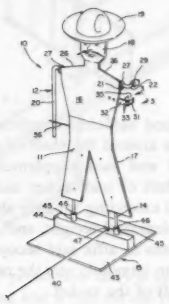
PISTOL DRAW TARGET

Ronald E. Hintz, Rte. 2, Box 206, Delta, Colo. 81416

Filed Apr. 8, 1976, Ser. No. 674,934

Int. Cl.[2] A63B *69/00*

U.S. Cl. 273—1 R **6 Claims**



1. A pistol draw target device intended for use by an individual to test and practice their skill in withdrawing a pistol from a holster, the pistol draw target device comprising, in combination:

a flat frame member in a shape defining a head portion, torso portion, and leg portion of an individual, the frame member having a flat front surface and a flat back surface;

a U-sahped leg defining member secured to the back surface of the frame member rearwardly of the leg portion thereof with its bight portion disposed nearest the torso and with its leg portions extending parallel to the frame member and outwardly of the frame member leg portions, each leg portion terminating an equidistance from the frame member;

a base member of a substantially rectangular flat configuration having a flat bottom surface adapted to rest firmly and securely on the ground, a top surface, and opposed end and side surfaces;

a pair of socket defining elements each affixed to the top surface of the base member a spaced distance apart from each other with their axis extending parallel to each other and normal to the plane of the base member, the spacing between the sockets being substantially equal to the spacing between the terminal ends of the U-shaped leg defining member wth the sockets adapted to receive therein said ends to support said frame member on said base member in an upright vertically disposed position;

a unitary rod member bent along its axis to define three portions thereof, namely, an arm member, a main body member, and a stub end member, the arm member disposed at a ninety degree angle to the body member and projecting outwardly in a radial direction therefrom, the stub end member disposed at a ninety degree angle to the body member and to the arm member and projecting outwardly from the body member in a direction normal to the plane defined by the combined arm and body members;

a plurality of bracket means rotatably securing the body member to the back surface of the frame member a short distance below a shoulder defining portion of the torso portion and extending in a horizontal direction and projecting outwardly from both sides of the frame member in the general area of the shoulders thereof;

said bracket means permitting rotatable movement of the body member about its longitudinal axis along with longitudinal movement therealong;

means affixed to opposite end portions of the body member inwardly of the stub end member and arm member thereof to limit the longitudinal sliding movement of the body member relative to the frame member by bearing against opposite side edges of the frame member;

said rod member when affixed to said frame member having the arm member extending vertically downwardly in an arm like manner with the stub end member extending outwardly rearwardly of the frame member back surface;

weight means secured to the stub end member to bias the stub end to seek a vertical position;

a stop member affixed to the frame member a distance vertically below the stub end member junction with the body member, the stop member having a U-shaped spring clip extending rearwardly outwardly therefrom of a size and configuration to engage and retain therein the stub end member when in the vertical position;

a rigid trigger arm having a leading end and a trailering end, the trailering end being bent into the shape of a loop;

bracket means securing the trigger arm in a horizontal position on the frame member back surface at a position disposed vertically below the waist of the torso portion, the trigger arm being slidable along its axis between an operative position where the leading end extends outwardly of the frame member a distance to engage the arm member when in the vertical position, and an in operative released position where it is free of the arm member and out of the path of movement of the arm member; and

a flexible cord having one end affixed to the loop of the trigger arm trailering end with its opposite end extending a distance outwardly and away from the frame member to the position of the individual using the pistol draw device;

whereby the device is armed by placing the arm member in the vertical downward position and retaining it there by engaging the trigger arm therewith, and upon the individual pulling the cord to release the trigger arm from engagement with the arm member the weighted stub end member rotates about the axis of the horizontal body member in a downward direction driving the arm member upwardly and forwardly of the frame member in a pistol drawing gesture.

4,052,059

HOCKEY STICK WITH ADJUSTABLE KNOB

Randle L. Rigsby, Rte. No. 1, Box 155, Signal Mountain, Tenn. 37377

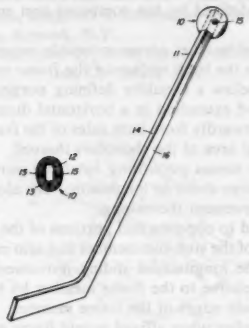
Filed May 30, 1975, Ser. No. 582,446

Int. Cl.[2] A63B *59/14*

U.S. Cl. 273—67 A **1 Claim**

1. An improved hockey stick, comprising in combination, a knob and a hockey stick member consisting of a straight handle which at one end is integral with a straight blade extending angularly respective thereto, said knob being unitary by comprising an undivided, integrated member of generally ovaloid shape and made of flexible plastic material, said hockey stick handle being cross-sectionally rectangular in shape, said knob having a central opening therethrough of similar cross-sectionally rectangular shape, an axially extending slit in a side wall of said opening and extending from an inner surface into the knob

wall less than the wall thickness thereof, said opening providing transverse stretching of said knob for frictional fit on said



handle, said knob being slideable along said handle, and securable fixedly thereto in a selected position by a pair of set screws on opposite sides of said knob.

4,052,060

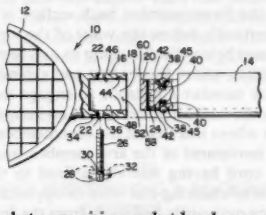
BREAK DOWN GAME RACKET

Robby P. Balkcom, Maywood, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 27, 1976, Ser. No. 680,852

Int. Cl.[2] A63B *49/02*

U.S. Cl. 273—73 R **8 Claims**



1. A game racket comprising racket head means, detachable handle means and handle securing section comprising:
   1. handle receiving means in said head and
   2. one end of said handle means detachably and overlappingly securable to said handle receiving means,
   3. registerable opening means in said receiving means and said handle where said handle and said receiving means overlap, the longitudinal axis of said opening means passing transversely through a plane lying in the longitudinal axis of said handle,
   4. securing means in said handle comprising pin means, arm means pivotally secured to one end of said pin means to swing in a plane passing through the longitudinal axis of said pin means, recess means in said handle securing means to pivotally receive and secure said arm means.

4,052,061

RACKET WEIGHTING MEANS

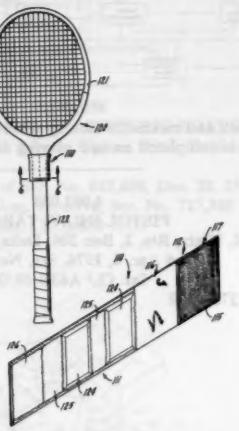
Samuel F. Stewart, 1119 Fleetwood Drive, Carlisle, Pa. 17013

Division of Ser. No. 596,038, July 11, 1975, Pat. No. 4,005,864, which is a continuation-in-part of Ser. No. 521,177, Nov. 6, 1974, abandoned. This application May 24, 1976, Ser. No. 688,955

Int. Cl.[2] A63B *69/38, 49/04*

U.S. Cl. 273—73 R **5 Claims**

1. An improved racket weighting means for use with a racket having a shaft with a throat connected to a frame, comprising:
   a. a first segment consisting essentially of a non-continuous flexible, substantially inelastic elongated member having opposed ends and adapted to be wrapped at least one time around the shaft of said racket,
   b. a supplemental weight integrally associated with said elongated member,
   c. a second segment for attaching said first segment to the racket consisting essentially of a non-continuous supple member extending from one of said opposed ends of said elongated member, said supple member being of a suffi-



cient length and sufficient suppleness to be wrapped at least one time around the shaft of said racket, with said first segment and said supplemental weight wrapped around the shaft of said racket and said supple member overlying and extending snuggly about said first segment and said supplemental weight, and
   d. fastening means to affix said second segment about said first segment to immobily seat the racket weighting means about the shaft of the racket.

4,052,062

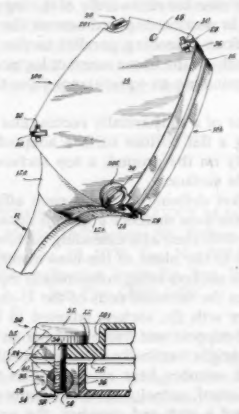
COMBINATION RACKET PRESS AND COVER

Roger M. Casavant, Winsted, Conn., assignor to Product Explorations Incorporated, Ridgefield, Conn.

Filed Mar. 29, 1976, Ser. No. 671,070

Int. Cl.[2] A63B *49/16, 49/18*

U.S. Cl. 273—74 **7 Claims**



1. A combination cover and press for a stringed racket which comprises: identical first and second molded halves,

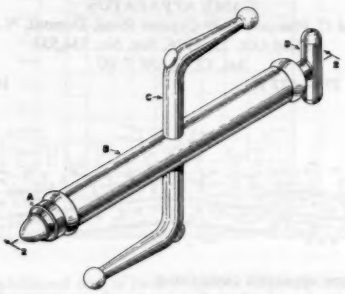
each including a major wal adapted to cover a face of said racket and a marginal wall extending from one surface thereof to encircle the edge of said racket, said marginal wall defining an opening therein for receiving the handle of said racket and including an exposed edge, at least two diametrically opposed first and second portions of said edge being configured to mate with corresponding second and first portions of the marginal wall edge of the other of said halves, and molded racket clamping ribs extending from said one surface of said major wall; and first and second latch means pivotally secured to each of said halves for selective engagement with the other of said halves for clampingly engaging said halves against opposite sides of the head of said racket.

4,052,063

MULTI-PURPOSE PROTECTION DEVICE

Michael Wong, 1647-A Leilehua Lane, Honolulu, Hawaii 96813

Filed June 14, 1976, Ser. No. 696,066
Int. Cl.[2] F41B *15/00*
U.S. Cl. 273—84 R **7 Claims**



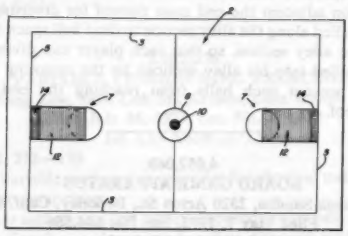
1. A multi-purpose protection device comprising a shaft with a point on one end and a butt on the other end and two bent prongs at the middle portion of the shaft, the prongs are bent in opposite direction from each other, each of the prongs being of such size and configuration that the last three fingers of a person's hand will fit along the base of the prong.

4,052,064

BASKETBALL GAME

John T. Kennoy, 421 Horsham Road, Horsham, Pa. 19044

Continuation-in-part of Ser. No. 483,420, June 26, 1974, abandoned. This application Aug. 15, 1975, Ser. No. 605,201
Int. Cl.[2] A63F *7/06*
U.S. Cl. 273—85 R **1 Claim**



1. A table-type simulated basketball game comprising, in combination, a rectangular playing board having a resilient upper surface providing a playing field of dimensions which are in general proportion to the standard athletic basketball court and defining end lines, side lines, foul circles and foul lanes which are parallel with said side lines, said game including

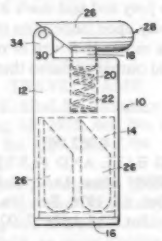
a. a vertically disposed and elevated backboard at each end of the playing field;
b. a horizontally disposed annular ring attached to each of said backboards in simulation of a basketball basket;
c. movable basketball simulating playing discs of the tiddleywinks type;
d. a manually-operated shooting piece for cooperation with said playing discs;
e. said playing discs and said manually-operated shooting piece for cooperation therewith being of such size, shape and consistency as to permit the latter to be so manually activated as to propel said playing discs into said annular rings;
f. means within said annular rings for retarding the falling movement of said playing discs through the horizontally disposed annular rings carried by said backboards;
g. a circle at the center of the playing field;
h. a concentric jump circle within said first-named circle and
i. a marked area directly under each of said annular rings;
j. said marked areas and said jump circle being of substantially the same color;
k. said foul lanes having a color which contrasts with the color of said marked areas and said jump circle;
l. the halves of the foul circles which are adjacent the foul lanes being of substantially the same color as that of the foul lanes;
m. the playing discs on one side having a color which at least resembles that of the foul lanes, and on the other side of a color which at least resembles the color of the jump circle and the aforementioned marked areas.

4,052,065

PROJECTILE CATAPULT AND BAT TOY

Jose Rodriquez, 750 E. 166th St., Apt. 10A, Bronx, N.Y. 10456

Filed Aug. 24, 1976, Ser. No. 717,237
Int. Cl.[2] A63B *59/06, 67/12*
U.S. Cl. 273—95 F **6 Claims**



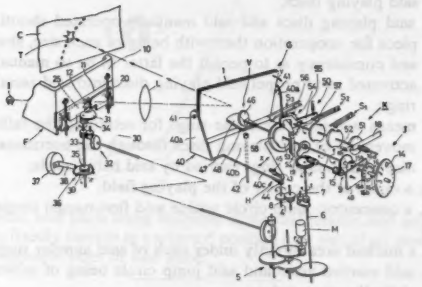
1. A toy comprising:
a stand;
a spring-mounted plunger on said stand;
a projectile having a cylindrical body and an inclined end surface adapted to be mounted on said plunger;
a rotatable pin on said stand, means mounting said pin in a position to contact the inclined surface of said projectile when said projectile is mounted on said plunger; and
a bat having at least one flat side for striking said projectile on said stand and in the air.

4,052,066

LIGHT-EMISSION GUN AMUSEMENT MACHINE FOR HOME USE

Takao Ohta, Hirakata, Japan, assignor to Nintendo Co., Ltd., Kyoto, Japan

Filed Feb. 19, 1976, Ser. No. 659,553
Claims priority, application Japan, Dec. 31, 1975, 51-158430
Int. Cl.² F41J 5/02, 5/06
U.S. Cl. 273—101.1 **6 Claims**



1. A light-emission gun amusement machine including a light emission gun, a photosensor element, a light source, a screen, a mirror interposed therebetween to refect the light beam from said light source onto said screen and thereby to produce a target mark thereon, which comprises a mirror drive system consisting of a mirror vertical drive mechanism including a driving shaft connected to a constantly revolving shaft connected to an electric motor in such a manner that said mirror is kept tilting back and forth throughout the rotation of said electric motor and a mirror horizontal drive mechanism including a driving shaft disconnectably associated with said constantly revolving shaft via a one-way clutch operable only in a normal direction of the motor, whereby said mirror is driven horizontally only during the rotation in normal direction of said electric motor, and a motor power supply control device including a switching mechanism for reversing the electrical connection between the motor and a power supply upon generation of an output signal by said photosensor element actuated by said light emission gun to reverse the rotational direction of said electric motor, whereby said target mark is caused to move diagonally in a composite direction made up of horizontal and vertical component directions on the screen by and during a normal rotation of the motor to simulate a flight of a prey and said mark is caused to move only vertically downwardly upon suspension of the horizontal drive of said mirror as the motor is driven in reverse in response to the generation of said output signal to thereby simulate a fall of said prey.

4,052,067

COMBINED BALL AND FLEXIBLE TRACK

Robert A. Carmo, 28886 Alton Ave., Wickliffe, Ohio 44092

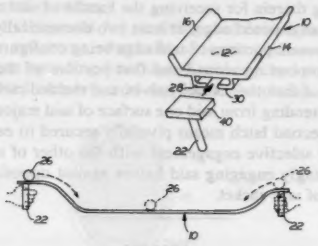
Filed Oct. 12, 1976, Ser. No. 731,130
Int. Cl.² A63F 7/00
U.S. Cl. 273—109 **9 Claims**

1. An amusement device comprising

a. an elongated flexible trackway of generally U-shaped cross section defined by continuous side rails and a coextensive relatively narrow bottom track portion therebetween,

b. means at each end of said flexible trackway for holding said trackway said holding means being adapted to be hand held with the open end of the U-shaped cross section upwardly directed, each of said holding means consisting of a tube and a laterally projecting rectangular flange at one end, the underside of said trackway including

c. means for holding said holding means with said flange being disposed against the underside of said trackway; and



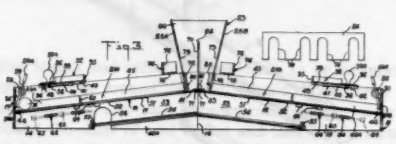
d. a spherical ball dimensioned for rolling contact with the bottom track portion and with at least one of said side rails.

4,052,068

GAME APPARATUS

Raymond C. Piacentino, 39 Cypress Road, Dumont, N.J. 07628

Filed Oct. 21, 1976, Ser. No. 734,533
Int. Cl.² A63F 7/00
U.S. Cl. 273—122 R **14 Claims**



1. Game apparatus comprising

a playing board adapted to have a player stationed at each end thereof;

a plurality of balls;

a series of alleys for said balls on said board, each of said alleys extending between the ends of said board and having an end zone at each end thereof;

vision-obstructing divider means mounted on said board and extending transversely of said alleys for dividing each of said alleys into two player-sections, said divider means having a height sufficient to prevent each player from visually observing the player alley sections of the opposing player;

player-operable ball propulsion means at each end of each of said alleys for propelling said balls along said alleys, so that each player can propel balls along selected player alley sections of the opposing player into the end zones thereof; and

player-operable ball diversion means in each player alley section adjacent the end zone thereof for diverting balls propelled along the alley section to dead ball space outside of the alley section, so that each player can divert balls propelled into his alley sections by the opposing player and prevent such balls from reaching the end zones thereof.

4,052,069

BOARD GAME APPARATUS

Shamir Singh Sandhu, 2320 Acton St., Berkeley, Calif. 94702

Filed May 7, 1976, Ser. No. 684,556
Int. Cl.² A63F 3/02
U.S. Cl. 273—131 AB **1 Claim**

1. A game apparatus comprising

a playing board divided into a playing field of one hundred squares arranged in ten rows and ten columns, said board having a first opponent's side disposed parallel to said

rows, and a second opponent's side disposed opposite said first opponent's side and parallel to said rows,

a first set of playing pieces, each piece adapted to be placed on and fit within a square of said board,

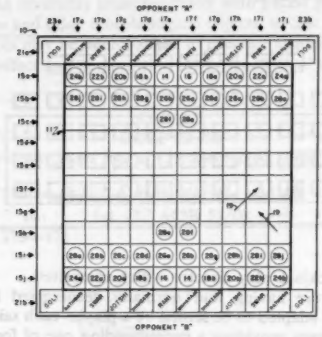
a second set of paying pieces visually distinguishable from said first set of playing pieces, each piece adapted to be placed on and fit within a square of said board,

said first and said second sets of playing pieces each comprising

two individual playing pieces which are visually distinguishable from each other and all other playing pieces of the set,

five pairs of playing pieces each pair visually identical to each other and visually distinguishable from all other playing pieces of said set,

ten playing pieces each visually identical to each other and visually distinguishable from all other playing pieces of said set,



a first additional row of twelve squares disposed nearest said first opponent's side, said squares containing indicia indicting placement location of particular pieces selected from said two individual and five pairs of playing pieces, the second and eleventh squares of said first additional row disposed in alignment with the rightmost and leftmost columns, respectively, of said playing field and with the first and twelfth squares of said first additional row extending beyond the lateral sides of said playing field, and

a second additional row of twelve squares disposed nearest said second opponent's side, said squares containing indicia indicating placement location of particular pieces selected from said two individual and five pairs of playing pieces, the second and eleventh squares of said second additional row disposed in alignment with said rightmost and leftmost columns, respectively, of said playing field and with the first and twelfth squares of said second additional row extending beyond the lateral sides of said playing field.

4,052,070

VARIABLE TENSION RING EXERCISER

Hyok Sang Lew, 7890 Oak St., Arvada, Colo. 80005

Filed July 16, 1973, Ser. No. 379,413

Int. Cl.[2] A63B 21/12

U.S. Cl. 272—120 **4 Claims**

1. A variable tension ring exerciser for physical training, said exerciser comprising:

a first bar including a first pulley disposed within one extremity of said first bar and a second pulley disposed within other extremity of said first bar;

a first ring secured to one end of a first rope, said first rope engaging said first pulley;

a second ring secured to one end of a second rope, said second rope engaging said second pulley;

a belt securable to the lower torso of an exercising person, said belt including;

a. a first means of adjusting the length of the front half of said belt;

b. a second means of adjusting the length of the rear half of said belt;

c. a first strap securable around one thigh of a person wearing said belt; whereby, said first strap prevents said belt from slipping upward; and

d. a second strap securable around other thigh of a person wearing said belt; whereby, said second strap prevents said belt from slipping upward;

a third rope attached to said belt intermediate said first and second means of adjusting the length of said belt;

a fourth rope attached to said belt diametrically to said third rope;

a first mechanically advantageous hoist means linking said first and third ropes; whereby, pull of said first ring hoists said belt;

a second mechanically advantageous hoist means linking said second and fourth ropes, whereby, pull of said second ring hoists said belt;

wherein said first and second hoist means providing mechanical advantage include means of varying tensions on said first and second ropes, said tensions caused by the weight attached to said belt;

wherein a plurality of sheaves disposed along said first bar constitute part of said hoist means providing mechanical advantage; and

wherein a second bar is disposed intermediate said first bar and said belt, said second bar including:

a. said third rope extending from said belt secured to one extremity of said second bar;

b. said fourth rope extending from said belt secured to other extremity of said second bar; and

c. a plurality of sheaves disposed along said second bar constituting part of said hoist means providing mechanical advantage.

4,052,071

TRAVEL GAME

Jack Siegfried, 1154 E. 82nd St., Brooklyn, N.Y. 11236

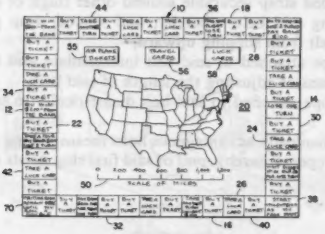
Filed Aug. 18, 1975, Ser. No. 605,679

Int. Cl.[2] A63F 3/04

U.S. Cl. 273—134 AC **2 Claims**

1. A game device comprising main game board means with opposite spaced end edges and opposite spaced front and rear edges interconnecting said end edges to delineate and define a main playing board field, an inner playing field having a map disposed thereon carried by said main game board means and spaced from said end edges and said front and rear edges, an outer playing marginal field carried by said main game board means intermediate said inner playing field and said end edges and front and rear edges of said main game board, a plurality of playing boxes carried by said outer playing marginal field, first player marker means constructed for movement sequentially about on said outer playing marginal field, and number selecting gaming means comprising a pair of six sided dice for controlling and regulating said movement of said player marker means, said first player marker means comprising a first plural-

ity of marker discs for placement upon said playing boxes as guides on casting of said dice, second player marker means comprising a second plurality of marker discs for placement upon said map, a plurality of bills of paper play money of various denominations for being played by the players in the game, a plurality of travel cards, each of said travel cards having different starting locations and ending locations locatable on said map, a plurality of different airplane ticket cards to



be purchased with the play money, and a plurality of different luck cards, each of said luck cards having a different lucky or unlucky direction for use in playing said game in accordance with the cast of the dice and the play of the game, each of said playing boxes containing directions for the selection of one of said airplane ticket, travel, or luck cards, said airplane ticket, travel, and luck cards disposed in stacks upon said inner playing field and directing the movement of said second plurality of marker discs upon said map.

4,052,072

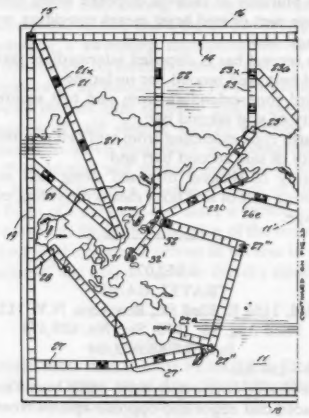
EDUCATIONAL WORLD MAP GAME

Philip E. Beal, 43 Merrill St., Portland, Maine 04101

Filed Feb. 23, 1976, Ser. No. 660,485

Int. Cl.² A63F *3/04*

U.S. Cl. 273—134 AC **5 Claims**



1. In an educational world map game, a game board displaying a world map with the several continental outlines thereon, each of the continental outlines having the various country areas outlined and designated therein, a line of pachisi-like playing spaces extending about the periphery of the game board, a plurality of lines of pachisi-like playing spaces respectively extending inwardly at different points along said peripheral line and terminating respectively at the respective continental outlines and at a country area outlined therein, certain of said inwardly-extending lines of spaces having branch lines of spaces and intersecting one another, thereby extending the certain inwardly-extending lines of spaces to more than one continental outline, playing pieces adapted to be advanced along the pachisi-like playing spaces from a starting point in at least one of the lines of playing spaces in response to numbers as appearing from a set of dice thrown in turn by the players of the game and toward selective designated country areas of a continent and a plurality of jigsaw puzzle parts corresponding in number to at least the respective number of country areas of all the continental outlines and adapted to be fitted over the country areas when the playing pieces have arrived at the country area terminals and in jigsaw puzzle fashion with one another to finally fill up the continental outlines of the world map to conclude the game.

4,052,073

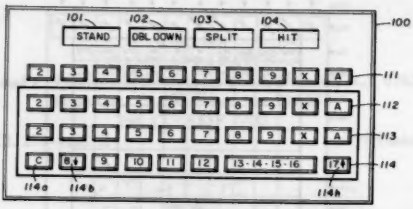
BLACKJACK PLAY DIRECTOR

Franklin E. Miller, 6936 Rockview Lane, Dallas, Tex. 75214

Filed Nov. 6, 1975, Ser. No. 629,591

Int. Cl.² G09B *19/22*

U.S. Cl. 273—148 R **9 Claims**



1. A blackjack play director which comprises:

a. structure having four normally deenergized indicator means adapted to be sensed by a player, each said indicator means providing a corresponding one of four blackjack play responses when energized,

b. a plurality of input switches, and

c. circuit means interconnecting said switches and said indicator means for exclusive actuation of any one of said four indicator means

i. said circuit means including means responsive to closure of a first of said switches representative of the value of a dealer's up card, and

ii. means further responsive to closure of one or more additional ones of said switches to represent the status of the player's first two cards, said circuit means being constructed and arranged in dependence upon a predetermined odds criteria to signal to said player a proper response by actuation of one of said indicator means.

4,052,074

TWO-SIDE VIEWABLE KALEIDOSYMMETRIC MORPHOLOGICAL PUZZLE GAME

James Oliver Fogle, and Reiko Iwao Fogle, both of P.O. Box 325, Oceano, Calif. 93445

Filed Dec. 12, 1975, Ser. No. 640,314

Int. Cl.² A63F *9/08, 9/10*

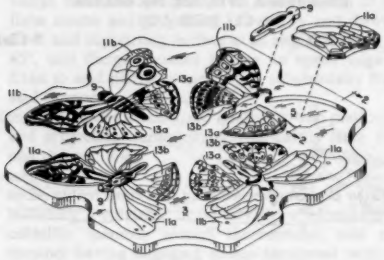
U.S. Cl. 273—157 R **8 Claims**

1. Two-side viewable puzzle game apparatus comprising

a tray for assembly of puzzle pieces thereon, said tray having a transparent base; and

a plurality of interfitting puzzle pieces, said puzzle pieces adapted for interfitted arrangements on said tray base to form an assembly having top and bottom faces bearing a design on each of said top and bottom faces, the design on said bottom face being viewable through said transparent base, said designs each depicting a plurality of substantially realistic, differently variegated morphological objects having inter-object or intra-object symmetrical characteristics, said puzzle pieces having perimetric shapes conforming to natural inter-object or intra-object symmet-

ric boundaries of said morphological objects, at least some of said puzzle pieces being interchangeable with puzzle pieces in other of said morphological objects and, also,



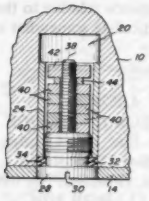
being reversibly interchangeable with puzzle pieces in the same and other morphological objects, so that said puzzle pieces may be interchanged to produce a kaleidosymmetric effect and demonstrate the symmetries of nature.

4,052,075

GOLF CLUB

C. Robert Daly, Rte. No. 1, 75 Pasco Road, Zephyrhills, Fla. 33599

Filed Jan. 8, 1976, Ser. No. 647,408
Int. Cl.[2] A63B *53/08*
U.S. Cl. 273—171 **2 Claims**



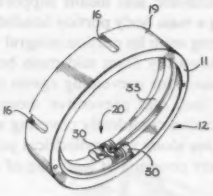
1. A golf club having a recess in the head thereof for receiving a weight insert, the weight insert including:
   a. a tubular sleeve having a flat annular bottom surface at one end thereof positioned in the head recess,
   b. said one end thereof being internally threaded,
   c. a flat headed screw member,
   d. the head of said flat head screw having a diameter equal to the outside diameter of said sleeve,
   e. a first threaded shank on said screw member threadedly engageable with the internally threaded end of said sleeve,
   f. said flat headed screw member further including a non-threaded shoulder forming a substantial annular recess between said flat head and said first threaded shank,
   g. an O-ring seated in said annular recess, the thickness of which O-ring approximates the height of said annular recess,
   h. the diameter of said O-ring approximating the diameter of said flat head,
   i. a second threaded shank having a cross section less than the cross section of said first shank and extending centrally and axially from said first shank,
   j. weight means positioned on said second threaded shank and of a diameter less than said sleeve and positioned within said sleeve,
   k. retaining means threadedly engaged in said second threaded shank for holding said weight means thereon,
   l. said retaining means having a diameter less than said sleeve,
   m. said retaining means, said weight means and said second threaded shank being positioned in assembled relation within said sleeve, and
   n. said O-ring, when said first threaded shank is threaded in said sleeve, being compressed between said flat annular bottom of said tubular sleeve, said flat head, said annular recess and said recess in the golf club head.

4,052,076

SCREW SEAL

Paul V. Wysong, Sepulveda, Calif., assignor to Schrillo Company, Sepulveda, Calif.

Filed June 28, 1976, Ser. No. 700,546
Int. Cl.[2] F16J *15/16*
U.S. Cl. 277—24 **5 Claims**



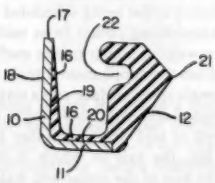
1. A screw seal comprising:
   a generally cylindrical carrier having an interior for engaging a screw;
   a wiper body engaging said carrier;
   a first, second and third spaced-apart parallel lands with arcuate radially inner sections extending radially inwardly into said interior of said carrier from said wiper body, said lands generally parallel to the axis of said carrier;
   a wiper seal disposed between said second and third lands and facing inwardly into said interior of said carrier;
   a drain groove defined between said first and second lands, said groove parallel to the axis of said carrier and extending radially outwardly beyond the inner most surface of said wiper seal;
   whereby when said lands engage a screw, lubricants wiped by said wiper seal flow in said drain groove generally parallel to the axis of such screw, such lubricants may thus be retained within a nut, ball screw, or the like which is coupled to said screw seal; and including a sealing member helically disposed within said interior of said carrier from opposite sides of said wiper body.

4,052,077

SHAFT SEAL WITH CLINCH-BUTT METAL CASE AND METHOD OF MAKING SAME

Samuel E. MacArthur, Lathrup Village, and Stanley N. Smith, Farmington, both of Mich., assignors to Federal-Mogul Corporation, Detroit, Mich.

Filed Apr. 5, 1976, Ser. No. 673,577
Int. Cl.[2] F16J *15/32*
U.S. Cl. 277—183 **3 Claims**



1. A radial lip shaft seal including, in combination:
   a rigid generally cylindrical reinforcing case having a cylin-

drical portion with a free end, a flange portion extending radially from said cylindrical portion at an end thereof opposite said free end, said flange portion also having a free end,

said case being formed initially from a flat rigid rectangular strip bent along its major axis to define said cylindrical portion and said flange portion, the ends of said strip defining a continuous parting line extending throughout the axial length of said case including said cylindrical portion and said flange portion, the ends of said strip along the parting line within the area of said cylindrical portion being in abutting engagement with one another, and the ends of said strip along the remainder of said parting line within the flange portion being in spaced relation with one another, elastomeric seal means supported by said case and including a main body portion bonded to said case and a shaft engaging main lip portion integral with and extending radially inwardly from said main body portion, and preventive means for preventing egress of lubricant from said parting line, said preventive means including said main body portion completely covering at least the entire said parting line along said cylindrical portion of the case and completely covering at least one of said free ends of the case, and

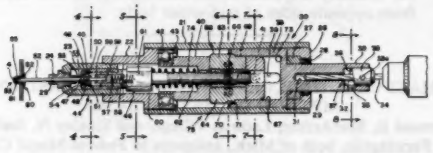
said main lip portion including a continuous, inseparable, circumferential lip adapted to engage a cylindrical shaft at an uninterrupted edge defined by the intersection of two radially inwardly mutually converging surfaces of said main lip portion.

4,052,078

POWER TRANSMISSION COLLAR

Eliezer Benimetzki, c/o Brilliant Lighting Fixture Corp., 12 W. 31st St., New York, N.Y. 10001

Division of Ser. No. 481,872, June 21, 1974, Pat. No. 3,906,775. This application July 7, 1975, Ser. No. 593,745
Claims priority, application Israel, July 1, 1973, 42637
Int. Cl.² B23B *47/00*; F16D *11/06*
U.S. Cl. 279—93 **1 Claim**



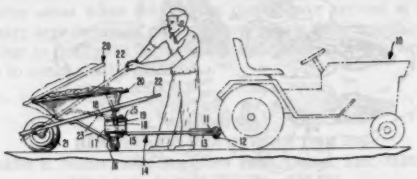
1. A power transmission mechanism comprising a collar attachable to a bit, said bit being scheduled for intermittent selective use as a rotating bit, a driven number adapted to actuate a supplimental tool, said member having a well on one end thereof, said well including a single transverse pin therein said power transmission collar being scheduled for intermittent selective use for transmitting power from said rotating bit to said driven member without impairing the usefulness of the bit when dissociated from the supplemental tool, said collar having a self-guiding single spiral surface and a single power-transmission surface engageable with said single pin, said collar fitting into said well of said driven member and against said single cylindrical pin, the axis of which is directed radially inwardly toward the axis of the collar and well, the tip of said single pin being spaced from the bit, said pin having surfaces toward which said single spiral surface guides the collar to said single power-transmission surface engagement with said single pin.

4,052,079

WHEELBARROW TRANSPORT MEANS

Maurice E. Lehman, 1960 Horseshoe Road, Lancaster, Pa. 17601

Filed June 3, 1976, Ser. No. 692,524
Int. Cl.² B62B *1/26*
U.S. Cl. 280—47.2 **7 Claims**



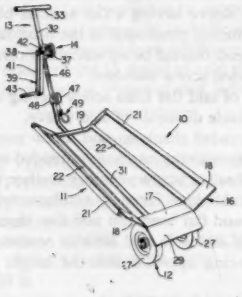
1. A wheelbarrow transport apparatus comprising a dolly having a pair of laterally spaced rear end caster wheels and a generally horizontal body portion extending forwardly of said caster wheels and adapted for coupling to a towing vehicle, a wheelbarrow having a rear leg structure and handles and a single forward ground wheel, and means on said dolly forming a rigid supporting socket for said leg structure and receiving the leg structure and supporting the same on the dolly elevated from the ground with the wheelbarrow handles extending forwardly above the dolly and said ground wheel of the wheelbarrow arranged rearmost and rolling on the ground rearwardly of the dolly, said rigid supporting socket resisting turning of the wheelbarrow leg structure in a horizontal plane and having sufficient clearance relative to the wheel structure whereby the latter can articulate somewhat in a vertical plane relative to the dolly.

4,052,080

CART FOR LIVESTOCK

Fred L. Hedderich, P.O. Box 106, Camden, Ind. 46917, and Curtis C. George, P.O. Box 218, R.R. No. 1, Flora, Ind. 46929

Filed June 24, 1976, Ser. No. 699,254
Int. Cl.² B62B *1/06*
U.S. Cl. 280—47.26 **12 Claims**



1. A tiltable, handle-propelled, attendant-stabilized wheeled cart, comprising:

elongated platform means having an upwardly directed supporting surface, said platform means when in a position of use being disposed with the elongated longitudinal direction thereof extending substantially horizontally;

support roller means mounted on said platform means and adapted for rolling engagement with the ground or a floor, said support roller means being disposed below said supporting surface and rotatable about an axis which is substantially perpendicular to the longitudinal direction of said platform means, said support roller means being posi-

tioned with said axis disposed closely adjacent one end of said platform means;

guide means fixed to said platform means at said one end thereof to assist in guide a load, such as an animal, onto the supporting surface, said guide means including a platelike flange member rigidly fixed to said one end of the platform means and projecting outwardly and downwardly from said supporting surface at an angle of approximately 45°, said flange member having an upper edge thereof fixed to said platform means and substantially flush with said supporting surface;

elongated handle means fixed relative to said platform means and projecting outwardly and upwardly from the other end thereof; and

winch means mounted on said handle means to permit a load to be pulled onto said platform means, said winch means including a rotatable drum having an elongated flexible cablelike member wound therearound, said cablelike member having engaging means associated with the free and thereof for engagement with the load.

4,052,081

BUSSING CART

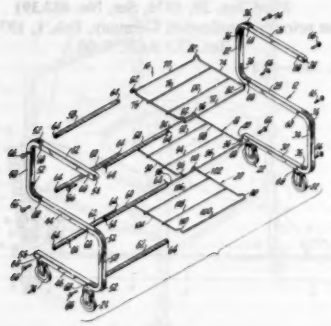
Frederick R. Becker, III, Dallas, Pa., assignor to Metropolitan Wire Corporation, Wilkes-Barre, Pa.

Filed Jan. 13, 1976, Ser. No. 648,726

The portion of the term of this patent subsequent to Nov. 30, 1990, has been disclaimed.

Int. Cl.² B62B 3/02

U.S. Cl. 280—79.3 **14 Claims**



1. A cart comprising:

a. a pair of laterally spaced apart, generally S-shaped side frame members;

b. connecting means extending between said side frame members for securing one side frame member to the other side frame member, said connecting means including a plurality of spaced apart rods of equal length and fastener means for securing said rods to said side frame members;

c. platform means for supporting articles extending between said side frame members and being supported on said connecting means;

d. each of said side frame members including vertically spaced apart upper, middle and lower sections that are disposed parallel to each other in substantially horizontal planes, a first substantially vertical section connecting said upper and middle sections, and a second substantially vertical section connecting said middle and lower sections to provide a S-shaped configuration;

e. a first pair of said rods being secured to each of said upper sections and a second pair of said rods being secured to each of said lower sections of said side frame members, and at least one of said platform means being mounted on one of said pairs of rods;

f. said at least one of said platform means including opposite end portions provided with hook-shaped engaging means for releasably engaging each rod of said one of said pairs of rods; and

g. rollable caster means for rolling said cart being secured to said side frame members, said rollable caster means including a pair of spaced apart casters disposed on each of said lower sections of said side frame members.

4,052,082

ARTICULATED HANDLE WHEELED VEHICLE

Lawrence T. Jones, Playa Del Rey, and Anson Sims, Northridge, both of Calif., assignors to California R & D Center, Culver City, Calif.

Filed July 6, 1976, Ser. No. 703,014

Int. Cl.² B62B 7/00

U.S. Cl. 280—87.02 R **9 Claims**

1. A toy vehicle comprising;

a body member having a recessed channel;

a plurality of wheels rotatively connected to the body member; and

an articulated handle member connected to the body member and further having at least two parts pivotally mounted to each other and capable of retroflexion, the articulated handle member being stored within the recessed channel when in a state of retroflexion.

4,052,083

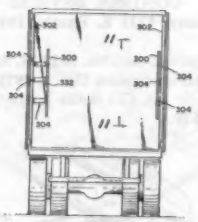
LOAD BRACING DEVICE

David Edward Lutz, 300 Washington Lane, Carlisle, Pa. 17103

Continuation-in-part of Ser. No. 458,384, April 5, 1974, abandoned. This application Jan. 22, 1975, Ser. No. 542,987

Int. Cl.² B60P 7/14

U.S. Cl. 280—179 R **6 Claims**



1. A load-bracing device for use in a load-carrying vehicle having side walls comprising at least one means mounted on one of the side walls of said vehicle for engaging and bracing a load, said load-engaging means comprising an elongated load-engaging member, hinge means connecting said load-engaging member to said one side wall for movement toward and away from said wall in parallelogram fashion and between a collapsed position and an expanded position, means for main-

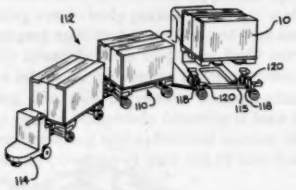
taining said load-engaging member in the expanded position, and a flexible panel connected at one end to the front end of the vehicle and at the other end to the end of the load member adjacent to said front end, said panel preventing objects from lodging between said front end and said adjacent end of said load-engaging member.

4,052,084

MATERIAL HANDLING APPARATUS

Robert L. Propst, Ann Arbor, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed Apr. 1, 1976, Ser. No. 672,658
Int. Cl.² B62D *21/00*
U.S. Cl. 280—408 **5 Claims**



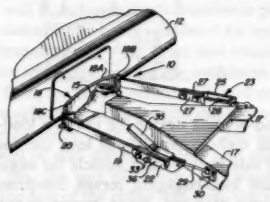
1. A pallet comprising a generally rectangular base having a plurality of spaced apart support legs extending downwardly from the corners thereof and an additional pair of support legs at the ends of the base intermediate the corner legs, an upwardly extending frame mounted on said base at a position in substantially vertical alignment with said pair of support legs, and means on horizontally opposite sides of said frame for detachably hanging a plurality of containers thereon, said hanging means comprising a plurality of generally horizontally extending vertically spaced support rails, each of said rails projecting transversely of said frame so as to provide a support on which a plurality on containers can be hung, and plurality of load carrying containers having side walls and open upper ends mounted on said rails on opposite sides of said upwardly extending frame, each of said containers having an outwardly and thence downwardly extending flange at said upper end thereof, each of said containers being supported on said rails by having the flange thereon hooked over and slidably supported on one of said rails with one side wall of said container engaging the rail immediately below said one rail to enable sliding movement of said containers on said rails.

4,052,085

FLEXIBLE CONNECTORS FOR TRAILER SWAY CONTROL DEVICES

William L. Rendessy, 4231 E. Rancho Drive, Phoenix, Ariz. 85018

Continuation-in-part of Ser. No. 502,058, Aug. 30, 1974, Pat. No. 3,920,266. This application Oct. 6, 1975, Ser. No. 619,842
Int. Cl.² B60D *7/00*
U.S. Cl. 280—446 B **13 Claims**



1. A tension controllable flexible connector means for a sway control device for trailers which passes over a frictionally damping surface for preventing uncontrolled lateral movement of the towed trailer comprising:

a flexible belt connector comprising first and second means and an intermediate portion,

said first and second ends adaptedly securable to spaced positions on a vehicle,

said intermediate portion of said connector adapted to cooperatively engage the external surfaces of a curved guiding surface of the sway control device in a taut manner to cause frictional damping thereon, and

means connected to one end of said flexible connector for tightening and loosening the intermediate portion of said flexible connector from the curved surface of the sway control device,

said means comprising a toggle release having an elongated first member secured at one end to said flexible connector and having a second movable toggle member pivotally mounted at the other end of said first member,

said toggle member is pivotally connectable to the vehicle at a point along its length, and when moved to an over center position along the length of said first member increasing the tension of said flexible connector on the curved surface of the sway control device and when moved to its under center position releasing tension of said flexible connector on said curved surface,

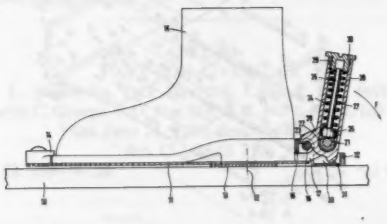
said flexible connector comprising a reinforced plastic belt.

4,052,086

SAFETY SKI BINDING

Erich Eckart, Oettingenstrasse 54, 8000 Munich 22, Germany

Filed Jan. 29, 1976, Ser. No. 653,391
Claims priority, application Germany, Feb. 1, 1975, 2504281
Int. Cl.² A63C *9/08*
U.S. Cl. 280—618 **13 Claims**



1. A safety binding for attachement of a ski to the boot of a skier comprising in combination a plate coextensive with the length of the boot means for unseparably connecting said plate to said ski for pivitol movement relative to the ski at the center of rotation of the leg of said skier, to freely rotate relative to said ski, a heel holding element mounted on said plate for rotation therewith, said heel holding element having resilient securing means for releasably holding said heel under torsional and tensile loads on said plate and means for the release of said resilient securing means operable in response only to a pulling force resulting from a tensile load on said leg and a coupling system interconnecting said ski and said heel holding element for converting the rotation of said plate relative to said ski in response to a torsional movement of said leg into a pulling force to releasing said resilient securing means

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4,052,087

FOLDABLE CASTER CHAIR FOR THE HANDICAPPED

Joseph A. Gagliardi, 2803 Sudberry Lane, Bowie, Md. 20715

Filed Nov. 22, 1976, Ser. No. 744,159
Int. Cl.² B62B *7/06*
U.S. Cl. 280—650 **10 Claims**

1. A foldable caster chair for use by the handicapped, comprising:

a rigid, generally rectangular seat member having first bear-

ing means on each of its opposite front corners, and second bearing means on each of its opposite rear corners;

a front leg assembly, including a pair of front legs each having third bearing means thereon near their upper end, said third bearing means being engaged with said first bearing means to pivotally mount said front leg assembly to the front corners of said seat member, so that said front leg assembly can be folded backwardly beneath said seat member;

a rear leg assembly, including a pair of rear legs, said rear legs being substantially longer than said front legs and each having fourth bearing means centrally thereon, said fourth bearing means being engaged with said second bearing means to pivotally mount said rear leg assembly to the rear corners of said seat member, so that said seat member can be folded upwardly toward said rear leg assembly;

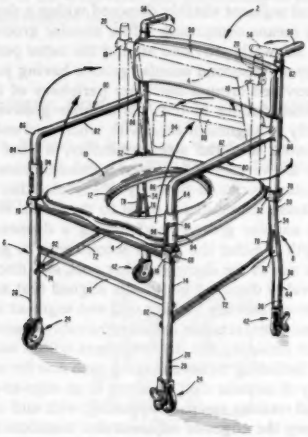
a pair of L-shaped arms, each including a generally horizontal portion and a generally vertical portion;

means pivotally mounting the outer end of the generally horizontal portion of each of said L-shaped arms on the upper portion of one of said rear legs, said L-shaped arms being of a length so that the lower ends of the generally vertical portions thereof are alignable with said front legs when both of said front leg assembly and said rear leg assembly are in an erect position relative to said seat member, and said L-shaped arms being pivotally mounted to swing in a generally horizontal plane when said front and rear leg assemblies are in said erect position, from a position wherein said generally vertical portions of said L-shaped arms are generally aligned with their respective front legs to a position wherein said L-shaped arms present no obstacle to the sideways movement of a person entering or leaving said seat member;

first locking means on the upper ends of said front legs;

second locking means on the lower ends of said generally vertical portions of said L-shaped arms, releasably engageable with said first locking means to releasably secure said rigid seat member, said front leg assembly and said rear leg assembly in said erect position; and

caster wheels mounted on the lower ends of each of said front legs and said rear legs.



4,052,088

VEHICLE SUSPENSION UNITS

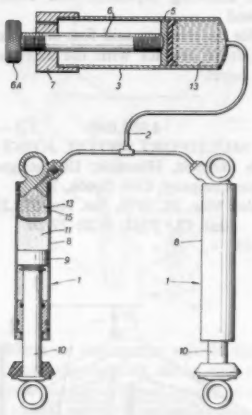
Lawrence George Nicholls, Tyseley, England, assignor to Girling Limited, Birmingham, England

Filed Jan. 8, 1975, Ser. No. 539,605

Claims priority, application United Kingdom, July 10, 1974, 30627/74

Int. Cl.[2] **B60G** *11/30*

U.S. Cl. 280—708 **3 Claims**



1. A suspension unit comprising a cylinder, means defining a pressure space within said cylinder filled with a dispersion of a mixture of fixed masses of gas and liquid, said means including a selectively movable end wall, a damping piston working through said dispersion in said pressure space, a piston rod fast with said damping piston and extending sealingly through one end of said cylinder, and means for selectively varying the position of said end wall to adjust the pressure in said pressure space, wherein said end wall is constituted by a diaphragm.

4,052,089

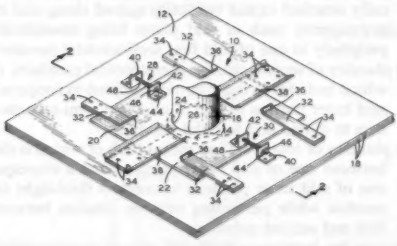
SELF-ADJUSTING SEAL ASSEMBLY

Norman Dean Weaver, Pickerington, Ohio, assignor to Diamond Power Specialty Corporation, Lancaster, Ohio

Filed June 10, 1976, Ser. No. 694,759

Int. Cl.[2] **F16L** *59/02*

U.S. Cl. 285—47 **5 Claims**



1. A seal assembly for structures having a member extending through thermal insulation panels which cover the structure while leaving a gap around the member comprising:

a thermal insulation panel adapted to receive said extending member so as

to leave a gap between said member and said thermal insulation panel;

a first seal member located on the external face of said ther-

mal insulation panel adapted to abut the extending member and partially enclose the gap between said member and said thermal insulation panel;

a second seal member slidably located on the external face of said thermal insulation panel to join with the first seal member to completely enclose the gap between the member and the thermal insulation panel;

biasing means for maintaining said second seal member against said first seal member to insure the sealing of the gap while allowing expansion and contraction of the member; and

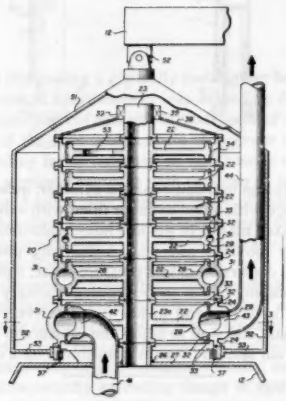
clip means for maintaining said first and second seal members in slidable contact with the external face of said insulation panel.

4,052,090

MULTIPORT SWIVEL JOINT

Donald Claude Stafford, Hinsdale, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Mar. 31, 1976, Ser. No. 672,273
Int. Cl.[2] F16L *9/20, 39/04*
U.S. Cl. 285—61 **4 Claims**



1. A multiport swivel joint for fluid flow comprising:

a central vertical stationary support;

a plurality of first circular semi-toroidal members of uniform diameter, each of which has an outer portion adapted to form a first section of a toroidal conduit for the flow of a fluid;

a plurality of horizontal circular support plates concentrically attached to and vertically spaced along said stationary support, each of said plates being connected at its periphery to one of said first semi-toroidal members;

a plurality of second circular semi-toroidal members, each of which includes an inner portion adapted to cooperate with said outer portion of one of said first semi-toroidal members to define said toroidal conduit;

a plurality of rotary sealing means each of which is disposed between one of said outer portions and a corresponding one of said inner portions to create a fluid-tight toroidal conduit while permitting relative rotation between said first and second members;

means for interconnecting said second semi-toroidal members, including vertical flanges attached to the periphery of each of said second members, whereby said second members form a rigid unitary structure;

a rotary bearing operatively connected to the lowermost of said second toroidal members for supporting the weight of said interconnected members and permitting rotation thereof about said central stationary support;

individual fluid inlet means connected to each of said first members; and

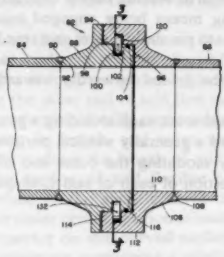
individual fluid outlet means connected to each of said second members.

4,052,091

COUPLING DEVICE

Billy W. Bowden, Hammond, La., assignor to T K Valve & Manufacturing, Inc., Hammond, La.

Filed Feb. 10, 1975, Ser. No. 548,223
Int. Cl.[2] F16L *21/02*
U.S. Cl. 285—305 **6 Claims**



1. In a coupling device for cylindrical segments and the like having an end segment slidably disposed within a sleeve member, locking means comprising a first annular groove having parallel flat sidewalls provided around the outer periphery of the end segment, a second annular groove having parallel flat sidewalls provided around the inner periphery of the sleeve member corresponding to the first annular groove and disposed directly in alignment therewith when said end segment is fully inserted into the sleeve member, a port provided through the sleeve member in open communication with the second annular groove, a plurality of circular disc members having thickness substantially equal to the width of said first and second annular grooves and having a diameter greater than the depth of either the first or second annular groove and less than the size of the sleeve member port, said disc members being removably disposed within the aligned first and second annular grooves thereby locking said end segment in place in the sleeve member, retainer means removably inserted within said port for retaining the disc members within said annular groove and including means engaging each disc for connecting the plurality of circular disc members in an edge-to-edge relationship, said retainer means cooperating with said connecting means to keep the edges of adjacent disc members in contact with each other when installed within the annular grooves.

4,052,092

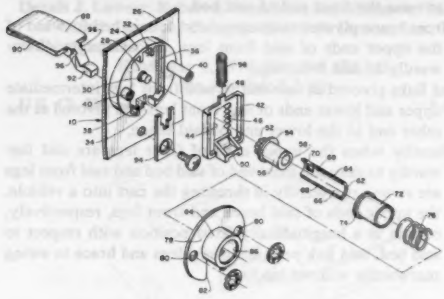
LATCH OPERATING DEVICE INCLUDING OPERATING AND LATCH CONNECTION IMPROVEMENTS

Gary Richard Bergen, Yorba Linda, Calif., assignor to Embart Industries, Inc., Farmington, Conn.

Filed Nov. 19, 1976, Ser. No. 743,284
Int. Cl.[2] E05C *1/14*
U.S. Cl. 292—172 **14 Claims**

1. In a latch operating device of the type imparting motion of an operating mechanism into partial rotation of a transversely extending spindle operably engaged with a longitudinally reciprocal latch, said spindle being half-round and having a semi-circular outer surface over a portion thereof, the operable connection between said spindle and latch operationally requiring said spindle semi-circular outer surface in non-operating position to always face in only a particular one of generally longitudinally forwardly and rearwardly direction regardless of the transverse side of said latch at which said operating mechanism is positioned; the improvements comprising: spindle mounting means operably connected to said operating mechanism so as to be positively partially rotatable about a transverse axis by said operating mechanism when in a normal

engaged position with said operating mechanism and freely rotatable about said transverse axis when disengaged from said operating mechanism in a temporary disengaged position; said spindle being secured to said spindle mounting means rotatable therewith about said transverse axis, free rotation of said spindle with said spindle mounting means in said spindle mounting



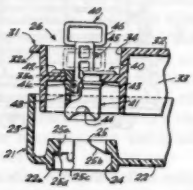
means temporary disengaged position permitting selective positioning of said spindle with said spindle semi-circular outer surface always facing in said particular one longitudinal direction for said spindle mounting means normal engaged position regardless of the transverse side positioning of said operating mechanism relative to said latch.

4,052,093

TELESCOPING ROTARY LATCH AND MANUFACTURE THEREOF

Lazzaro A. Fattori, 84 Rose Ave., Woodcliff Lake, N.J. 07680

Filed July 15, 1976, Ser. No. 705,520
Int. Cl.² E05C 3/10
U.S. Cl. 292—218 **12 Claims**



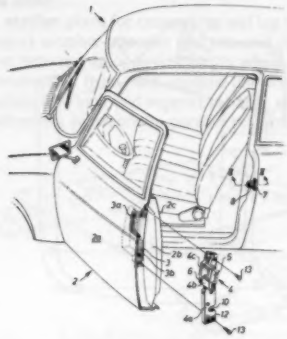
1. In a latching device for fastening a first component having a surface and a well recessed therefrom to a second component having a slot with a center enlargement in registered alignment with said well, a two-piece rotary latch for securing for rotation in the bottom of said well and having means for projecting through said bottom and through said slot and center enlargement adapted to engage borders of said center enlargement on rotation of the rotary latch to fasten said components together, said rotary latch comprising an inner member mounted to turn with and telescope into an axial bore of an outer member, said border engaging means being integrally formed on said outer member as radially projecting latching elements said inner member terminating in a finger grip for rotating said latch, said finger grip normally being recessed from said surface when in fully retracted position and projecting above said surface for accessibility when in extended position, and snap-in means having elements integrally formed with said members coacting between the outer member bore and said inner member retaining the latter in said fuly retracted position against accidental extension of the inner member and projection of said finger grip above said surface when the finger grip is not in use.

4,052,094

SANDWICH-TYPE MOTOR VEHICLE DOOR AND FLUSH MOUNTED LOCK CASSETTE

Bo Gustaf Widen, Torshalla, Sweden, assignor to GKN-Stenman AB, Eskilstuna, Sweden

Filed Jan. 13, 1976, Ser. No. 648,704
Claims priority, application Sweden, Jan. 17, 1975, 7500512
Int. Cl.² E05C 3/26
U.S. Cl. 292—336.3 **5 Claims**



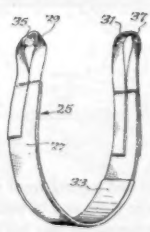
1. In combination, an automotive vehicle door of sandwich construction comprising spaced inner and outer sidewalls separated by a reinforcing layer and having an end wall joined at right angles to said sidewalls and extending along one end thereof, said end wall being recessed to form a cassette receiving compartment which extends between said sidewalls, said door outer sidewall being recessed inwardly from its edge adjacent said end wall and opening to said compartment, a cassette comprising a lock house part and a control part connected thereto, said cassette being mounted to said door and within said compartment with said lock house part mounted to said door end wall with its exterior face lying flush therewith, and said control part projecting through said outer sidewall recess opening and lying flush with and forming part of said outer sidewall surface.

4,052,095

SYNTHETIC ORGANIC POLYMERIC SLING PROTECTED BY VULCANIZED OR CURED ELASTOMERIC LAMINATE AT LOAD CONTACTING AREA THEREOF

Charles E. Johnson, Kenmore, N.Y., assignor to Buffalo Weaving and Belting Co., Buffalo, N.Y.

Filed Nov. 5, 1975, Ser. No. 628,958
Int. Cl.² B66C 1/12
U.S. Cl. 294—74 **18 Claims**



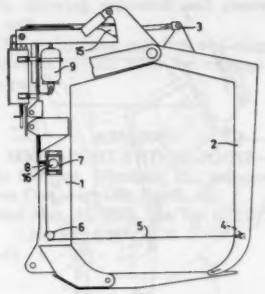
1. A sling which comprises a web of woven synthetic organic polymeric strands of a nylon or polyester filament with a lamina of elastomeric polychloroprene rubber material vulcanized or cured onto a load contacting surface thereof and filling surface openings between the polymeric strands.

4,052,096

HYDRAULICALLY OPERATED GRAPPLE OR TIMBER FORK

Karl Erik Wallberg, Lulea, Sweden, assignor to Kewaco AB, Lulea, Sweden

Filed Mar. 30, 1976, Ser. No. 671,816
Claims priority, application Sweden, Apr. 3, 1975, 7503830
Int. Cl.[2] B66C *1/00*
U.S. Cl. 294—88 **6 Claims**



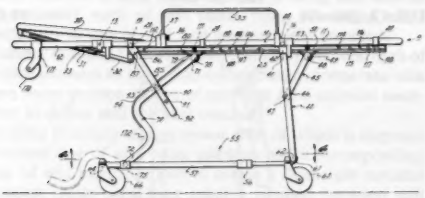
1. A hydraulically operated grapple comprising an openable and closable fork, a hydraulic cylinder for operating said fork, a wire connected to said fork, a hydraulically operated wire stretcher coupled to said wire to stretch the same such that the wire can contact a load carried by the fork and prevent the load from disarranging and/or falling out of the fork, a hydraulic circuit connecting a hydraulic pressure source, said hydraulically operated wire stretcher and said hydraulic cylinder to effect operation of said stretcher conjointly with said cylinder, and pressure accumulator means in said circuit between said hydraulic pressure source and said hydraulically operated wire stretcher for being pressurized during operation of said cylinder for supplying the wire stretcher temporarily with pressure fluid if said pressure source is cut off.

4,052,097

CART FOR HIGH DECK AMBULANCES

Burt Weil, Cincinnati, and Richard H. Ferneau, Washington Court House, both of Ohio, assignors to Burt Weil, Cincinnati, Ohio

Filed Apr. 19, 1976, Ser. No. 678,223
Int. Cl.[2] B62H *3/02*
U.S. Cl. 296—20 **2 Claims**



1. A cart comprising,

a normally horizontal bed having front and rear ends,

auxiliary wheels on the front end of said bed,

rear legs pivotally mounted on rear portion of said bed and extending downwardly from said bed,

front legs pivotally mounted on the front portion of said bed and extending downwardly from said bed,

means connecting said legs to ground engaging casters,

releasable means normally bracing said legs with respect to said bed and being releasable to permit said legs to swing rearwardly and upwardly while said front end of said bed is in a raised attitude,

the upper ends of said front legs being pivotally and slidably connected to said bed at a location which is normally rearward of the lower ends of said front legs, the upper ends of said front legs being slidable forwardly on said bed to raise the front end of said bed,

a front brace pivoted at its upper end to said bed forward of the upper ends of said front legs and extending downwardly to said front legs,

and links pivoted at one end to said front legs intermediate upper and lower ends of said front legs and pivoted at the other end to the lower end of said brace,

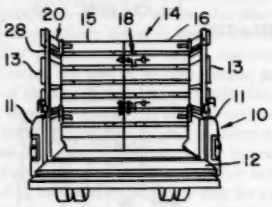
whereby when the upper ends of front legs are slid forwardly to raise the front end of said bed and said front legs are swung rearwardly in thrusting the cart into a vehicle, the upper ends of said brace and front legs, respectively, remain in a longitudinally fixed position with respect to said bed, said link permitting said legs and brace to swing rearwardly without binding.

4,052,098

ADJUSTABLE END GATE ASSEMBLY FOR PICK-UP TRUCK OR OTHER VEHICLE

Lloyd E. Metz, Box 43, R.R. No. 2, Fairbury, Ill. 61739

Continuation-in-part of Ser. No. 499,326, Aug. 21, 1974, abandoned. This application Apr. 26, 1976, Ser. No. 680,390
Int. Cl.[2] B62D *33/00*
U.S. Cl. 296—50 **6 Claims**



1. In combination with a vehicle such as a pick-up truck or the like having a load box and a floor and upright sides partially defining said load box, an improved adjustable end-gate assembly comprising:

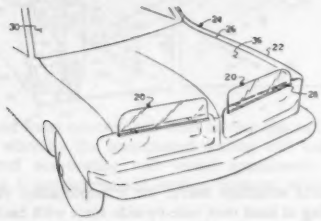
first and second gates, each approximately one-half the vehicle opening width, a pair of sliding hinge assemblies mounting each of said end gates to a respective side of said vehicle, each hinge assembly including a horizontally elongated stringer secured at forward and rear positions to an associated side of said vehicle, a sleeve slidably mounted on said stringer for movement between a forward position intermediate the ends of a side of said vehicle and a rear position adjacent the end of said vehicle, and hinge means carried by said sleeve for mounting an associated gate for pivotal motion about a vertical axis, each pair of said hinge assemblies permitting their associated gate to lower and rest on the floor of said truck box, whereby a livestock chute may be placed against the rear of said vehicle and said gates may be independently positioned along their associated stringers and rotated to contact an adjacent side of said chute to close off the side openings between said chute and said vehicle sides, said gates resting on the floor of said box in all adjusted positions.

4,052,099

ONCOMING AIR SPOILERS FOR VEHICLES, MOUNTED NEAR THE HOOD TO DEFLECT AIR CARRIED BUGS, RAIN, ROAD SPRAY, SNOW, AND LIGHTWEIGHT DEBRIS UP AND AWAY FROM THE WINDSHIELD

Dennis J. Lowery; Robert E. Merchant, and Milton A. Walls, all of Grand Junction, Colo., assignors to Dixson, Inc., Grand Junction, Colo.

Filed May 7, 1976, Ser. No. 684,142
Int. Cl.[2] B60J *1/20*
U.S. Cl. 296—91 **1 Claim**



1. A universally adaptable oncoming air spoiler arranged in two sub assemblies for mounting on wide, medium and narrow width vehicles near or on their extended hoods to deflect air carried bugs, rain, road spray, snow, and lightweight debris up and away from their respective windshields, comprising:

a. two alike air deflector planar panels having their top corners formed on a radius;

b. two alike channel supports to respectively co-extensively receive the bottom uniform edges of the two alike air deflector planar panels;

c. four mounting brackets to hold the universally adaptable oncoming air spoiler on a vehicle, as a pair of these mounting brackets are secured both to a channel support and to the vehicle, and each of the four mounting brackets is a strip of bendable material, scored at selected places along its length for subsequent intentional breaking at a score, drilled and countersunk between the scores, and bent at right angles near one end, independently of any score, thereby providing a choice of having either a long leg of selectable variable bracket length or a short leg positioned vertically, upon installing this universally adaptable oncoming air spoiler to the vehicle; and

d. selected multiple fastening assemblies used throughout the universally adaptable oncoming air spoiler, used at three different types of location either to secure the two air deflector planar panels to the respective channel supports, or to secure the respective channel supports to the respective mounting brackets, or to secure the respective mounting brackets to the vehicle.

4,052,100

COMBINED FOLDING TABLE AND SEAT ASSEMBLY

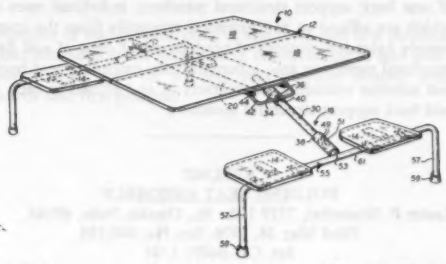
Edwin Nikitits, Lachine, and Jean Guy Demers, Outremont, both of Canada, assignors to Franklyn M. Markus, Cote St. Luc, Canada

Continuation-in-part of Ser. No. 625,695, Oct. 24, 1975, and Ser. No. 683,327, May 5, 1976. This application June 7, 1976, Ser. No. 693,341
Int. Cl.[2] A47B *83/02*
U.S. Cl. 297—159 **19 Claims**

1. In a collapsible combined table and seat of the type wherein said seat and table are relatively pivotally movable between an open position wherein said table and seat are horizontal and the front edge of said seat is disposed adjacent and below one end of said table and a folded position wherein said seat is in confronting substantially parallel relation with said table, an improved collapsible linkage for supporting said table and seat in said open position and for permitting said pivotal movement to said folded position, said linkage comprising:

a support member, a pivot for connected one end of said support member to said table adjacent said one end of said table for movement between an open position in which said support member extends downwardly from said table and a closed position in which said support member is in confronting parallel relation with the bottom surface of said table;

a leg, another pivot for connecting said leg to the end of said support member opposite said one end thereof for movement between an open position in which said leg extends downwardly from said support member and a closed position in which said support member and said leg are in confronting substantially parallel relation;



said seat being pivotally mounted on said leg for movement between an open position in which said seat extends horizontally from said leg when said leg and said support member are in their open position and a closed position in which leg and said seat are in confronting substantially parallel relation; means for holding said seat in said open position; and

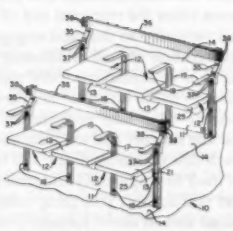
a longitudinally extending sleeve slidably mounted on said support member for movement between an unlocking position wherein said sleeve is out of overlapping relation with said other pivot to permit pivotal movement between said support member and said leg and a locking position wherein said sleeve overlies said other pivot to prevent movement thereabout.

4,052,101

STADIUM RISER INDIVIDUAL SEAT, SUPPORT AND ARMREST WITH COMMON SEAT-ROW BACKREST

David C. DeLong, 1221 Broad St., Grinnell, Iowa 50112

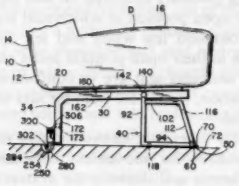
Continuation-in-part of Ser. No. 593,767, July 7, 1975, Pat. No. 3,989,299. This application Nov. 1, 1976, Ser. No. 737,681
The portion of the term of this patent subsequent to Dec. 2, 1993, has been disclaimed.
Int. Cl.[2] A47C *7/54, 1/12*
U.S. Cl. 297—243 **7 Claims**



1. In step riser mounted seating: a plurality of rowed individual seat means including, first structural members adapted to be mounted, in space-separated paralleled relationship, to the

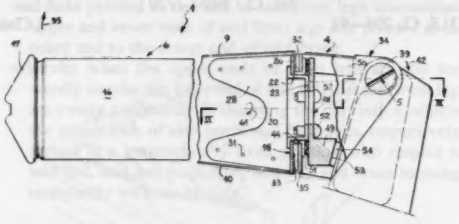
upright face of a step riser at each side of a seat; individual seat bottom means adapted for being mounted between and by pairs of successive adjacent ones of said first structural members; said first structural members being extended transversely above and below said individual seat bottom means mounted thereby; with the upper longitudinally extending portions of said structural members formed over by substantially ninety degrees, so as to coextend with, and be substantially parallel to, said seat bottom means, to provide armrest sections above and to each side of said individual seat bottom means; each of said first structural members being a continuous expanse of U-shaped channel, with the exterior surface of the channel web adapted to be juxtaposed with, and mounted to, the upright vertical face of a step riser; with such channel web exterior surface presenting upward facing armrest surfacing; a plurality of seat back support structural members, individual ones of which are affixed to and extended upwardly from the transversely extended portions of predetermined ones of said first structural members; and, a continuously extending seat backrest member extending transversely of and affixed to each of said back support structural members.

4,052,102
FOLDING SEAT ASSEMBLY
Lester P. Rosenthal, 7719 Lake St., Omaha, Nebr. 68164
Filed May 24, 1976, Ser. No. 689,195
Int. Cl.² B60N *1/04*
U.S. Cl. 297—334 **6 Claims**



1. A foldaway base for a seat comprising a pivoting support unit disposable above a floor, an attachment assembly for pivotally attaching said support unit to a floor and having portions attachable to said floor and said attachment assembly permitting said support unit to pivot about a horizontal first axis, an upper frame extending rearwardly from the top of said support unit, means pivotally attaching said upper frame to said support unit for rotation about a second axis parallel to said first axis and disposed upwardly and rearwardly therefrom and disposed adjacent the upper rearward portion of said support unit, and rearward leg means extending downwardly from said upper frame at a rearward part of said upper frame and adapted to engage said floor, a stop means on said support unit, means on said attachment assembly in position for engaging said stop means when the rearward end of said attachment assembly is lifted vertically so that said engagement with said stop means stops rotation of said attachment assembly about said second axis in a direction upwardly rearwardly of said second axis whereby further lifting of the rearward end of said attachment assembly after said engagement with said stop means will cause said support unit to rotate about said first axis in a direction such that said second axis will be caused to first shift laterally of itself first upwardly and forwardly to define a first shifting, and said support unit being constructed for permitting said second axis to move forwardly and downwardly after said first shifting and in response to an urging forward of said attachment assembly with respect to said first axis so that said attachment assembly reaches a desired certain storage position.

4,052,103
CENTRAL ARM REST FOR A COMPLEX OF AT LEAST TWO SEATS
Pierre T. Steinthal, Massy, France, assignor to Compagnie Nationale Air France, France
Filed May 14, 1976, Ser. No. 686,371
Claims priority, application France, July 22, 1975, 75.22763
Int. Cl.² A47C *7/54*
U.S. Cl. 297—417 **12 Claims**



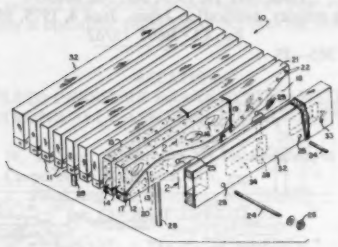
1. A seat structure useful for transportation vehicles and embodying at least two, side-by-side seats with back rests, and an arm rest pivotally mounted on said seat structure between said side-by-side seats for pivotal movement in a vertical plane between a normal, horizontal orientation of said arm rest and a retracted position with said arm rest disposed in a space between said side-by-side seats, said seat structure being characterized by an arm rest having a rear element and a forward element which is a prolongation of said rear element, said rear element having a width such that it will fit in the space between said seats and said forward element having an arm support surface of a width wider than said rear element and wider than said space between said seats and a depth such that said forward element will fit in said space between said seats, means pivotally mounting would rear element on said seat structure to effect said pivotal movement of said elements in unison between said normal, horizontal orientation of said arm rest and said retracted position in the space between said seats, and means for rotating said forward element with respect to said rear element through an angle of 90° about an axis extending longitudinally of said forward element between a first orientation of said arm support part wherein its width is in a horizontal plane and said arm support part can serve comfortably as an arm rest for both seats and a second orientation wherein said arm support surface is in a substantially vertical plane, whereby said forward element will fit in the space between said seats upon pivoting said arm rest to said retracted position.

4,052,104
SEATING UNIT
William H. Noss, 524 S. Muhlenberg St., Allentown, Pa. 18104
Filed July 28, 1976, Ser. No. 709,455
Int. Cl.² A47C *7/02*
U.S. Cl. 297—456 **7 Claims**

1. A seating unit, comprising:

a support structure including a contoured seat and back support, said support structure being comprised of a plurality of separate and independent sub-units, each contoured to include a portion of the seat and back support; a plurality of separate and independent pieces of resilient foam covering the seat and back support portions of each of said sub-units, said resilient foam having a non-seat and back shaped outer seating surface which is in non-conformity with the contour of the sub-unit, said resilient foam including a plurality of apertures shaped and arranged to provide the foam with sufficient flexibility whereby the foam upon being deformed by an occupant assumes a seat and back support shape corresponding to the contoured seat and back support of the support struc-

ture and the occupant is supported by the support structure; fabric covering each foam covered sub-unit; and means for supporting the individual fabric and foam covered sub-units in a spaced relationship to each other to form the seating unit of a plurality of individual spaced



fabric and foam covered sub-units having spaces therebetween, whereby the unoccupied seating unit has a dismembered non-seating unit visual appearance, which provides a pre-determined seating contour when occupied.

4,052,105

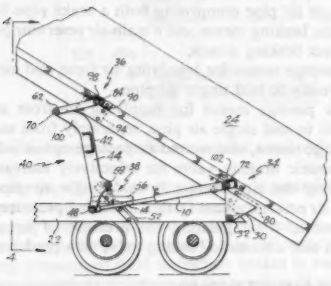
TRUCK HOIST

Walter Moe, 502 S. 12th St., Montevideo, Minn. 56265

Filed Apr. 9, 1976, Ser. No. 675,509

Int. Cl.² B60P *1/20*

U.S. Cl. 298—22 J **14 Claims**



1. A truck hoist assembly for use in combination with a dump vehicle having a chassis and dump bed pivotally mounted to said chassis, which comprises:

linkage means pivotally connected to said dump bed;

elongated lever means having one end pivotally connected to said linkage means and a fulcrum pivotally connected intermediate the ends of said lower means to said chassis; and

actuation means pivotally connected to the other end of said elongated lever means and to said dump bed for selectively pivoting said lever means about said fulcrum.

4,052,106

LIFT MECHANISM FOR TRUCK SIDEBOARDS

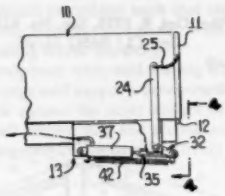
George D. Louderback, Sr., 108 Sugar Mill Road, Sterling, Colo. 80751

Filed Jan. 27, 1976, Ser. No. 652,775

Int. Cl.² B60P *1/26*

U.S. Cl. 298—23 MD **16 Claims**

1. A lift mechanism for use in positioning box sideboards and the like, said lift mechanism comprising a support, a position control arm, means mounting said position control arm on said support for pivotal movement about a generally horizontal axis for movement between a generally upright first position and a depending second position, an actuating arm connected to said position control arm for controlling the position of said position control arm, and positioning means carried by said support and coupled to said actuating arm for selectively permitting



movement of said position control arm from said first position to said second position independent of movement of said positioning means and for moving said position control arm towards said first position.

4,052,107

HYDRAULIC HAMMERS HYDRAULICALLY DRIVEN IMPACTOR

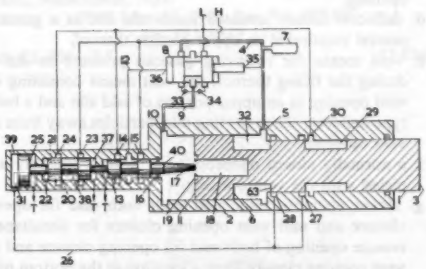
Andrew George Hay, Hamilton, Scotland, assignor to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Apr. 7, 1976, Ser. No. 674,410

Claims priority, application United Kingdom, Apr. 8, 1975, 14438/75

Int. Cl.² E21D *9/10*

U.S. Cl. 299—62 **4 Claims**



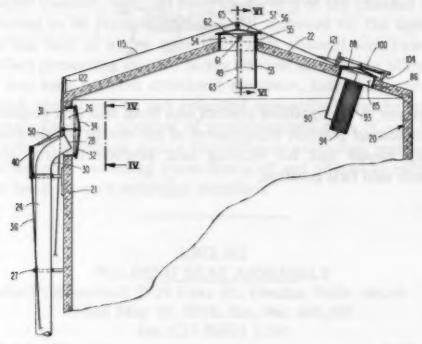
1. A hydraulically operable impactor comprising: a main piston reciprocable within a cylinder, said piston having opposing transverse faces and said cylinder having fluid transfer means for admitting pressurised hydraulic fluid to the said faces to advance and retract said main piston within said cylinder; a switch valve for controlling admission of said pressurised hydraulic fluid to at least one of said faces; and control means for actuating said switch valve, hydraulically arranged to initiate advancement of said main piston via said switch valve in response to a fluid pressure increase generated by said main piston during retraction thereof at an axial displacement of said main piston which is dependent upon the velocity thereof.

4,052,108

FILLING SYSTEM FOR A SILO

Richard L. Weaver, R.D. No. 1, Myerstown, Pa. 17067; John Stoltzfus, 543 Strasburg Pike, Lancaster, Pa. 17602, and Henry Stoltzfus, 618 Donegal Spring Road, Mount Joy, Pa. 17552

Filed Oct. 9, 1975, Ser. No. 621,154
Int. Cl.² B65G 53/40
U.S. Cl. 302—60 19 Claims



1. A filling system for a silo, wherein the silo is of the type having side and top walls, said filling system comprising:

a. a fill opening located at an upper end of a sidewall and communicating with the interior of the silo,

b. a normally closed openable fill opening closure operably associated with the fill opening,

c. a delivery duct disposed outwardly of the silo and extending therealong for delivery of fill material to said fill opening,

d. deflector means mounted inside the silo at a generally central location at an upper portion thereof,

e. vent means for releaving gaseous pressure in the silo during the filling thereof, the vent means consisting of a vent opening in an upper portion of said silo and a baffle-type deflector for deflecting dust particles away from said vent opening,

f. a normally closed openable vent closure operably associated with the vent opening,

g. means operably associated with both said fill opening closure and said vent opening closure for simultaneous remote opening of both said fill opening closure and said vent opening closure from a location at the bottom of the silo outside thereof, the remote means comprising,

1. a cable-like tension means having spring assist means operably associated with both said fill opening closure and said vent opening closure to facilitale opening of said fill opening closure and said vent opening closure against gravity forces induced by said tension means and that would otherwise urge said closures toward a closed position, and

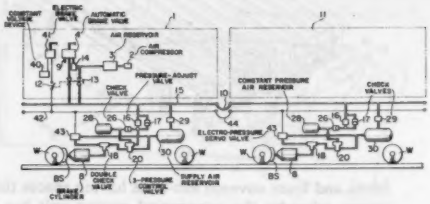
2. spring-biased latch means mounted at a location at the bottom of the silo outside thereof and operably associated with said cable-like tension means for controlling the tension in said cable-like tension means thereby simultaneously controlling the operation of both said fill opening closure and said vent opening closure.

4,052,109

AIR BRAKE SYSTEM EMPLOYING COMBINED AUTOMATIC AND DIRECT BRAKING

Kazuhiko Nagase, Tokyo, and Michihiko Takakubo, Yono, both of Japan, assignors to Japanese National Railways, Tokyo, Japan

Filed May 19, 1976, Ser. No. 688,075
Claims priority, application Japan, June 4, 1975, 50-66571
Int. Cl.² B60T 13/62
U.S. Cl. 303—25 4 Claims



1. In an air brake system for plural coupled vehicles such as trains, said system being of the type wherein each said vehicle has a brake applying cylinder movable between a brake applying position and a released position, said system further being of the type including both an automatic braking means for achieving a brake applying position in response to a decrease in air pressure and a direct braking means for achieving a brake applying position in response to a direct braking order, the improvement comprising:

an air reservoir;

a single air pipe extending longitudinally of said vehicles, said single air pipe comprising both a brake pipe for said automatic braking means and a main air reservoir pipe for said direct braking means;

first air passage means for supplying air from said air reservoir directly to said single air pipe;

second air passage means for supplying air from said air reservoir to said single air pipe, separately from said first air passage means, said second air passage means including an automatic braking valve for selectively increasing or decreasing the air pressure in said single air pipe, said second air passage means further including pressure-adjust valve means for regulating the pressure of air passing through said automatic braking valve to a predetermined value;

said first and second air passages being alternately operable to communicate said air reservoir with said single air pipe;

an electric brake valve;

each vehicle having storage reservoir means, connected to said single air pipe, to supply air to the respective said braking cylinder to move said braking cylinder to the brake applying position thereof;

each vehicle having an automatic braking control valve means, connected to said single air pipe, for supplying air from the respective said storage reservoir means to the respective said braking cylinder in response to a decrease in pressure in said single air pipe, to thereby initiate an automatic braking operation;

each vehicle having an electro-pneumatic servo valve means, electrically coupled to said electric brake valve and pneumatically coupled to the respective said braking cylinder and the respective said storage reservoir means, for supplying air from the respective said storage reservoir means to the respective said braking cylinder in response to a command from said electric brake valve, to thereby initiate a direct braking operation;

an electric switch connected between said electric brake valve and each said servo valve for interrupting connection therebetween; and

a double valve means for selectively opening said first passage means and closing said second passage means or

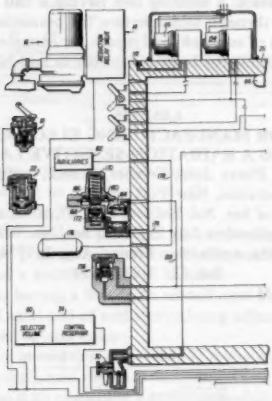
alternatively closing said first passage means and opening said second passage means, said electric switch being coupled to said double valve means to be closed when said first passage means is open and to be opened when said first passage means is closed;

whereby automatic braking will occur upon separation of said vehicles and opening of said single air pipe, even if the system is operating under the direct braking mode.

4,052,110
FLUID PRESSURE BRAKE SYSTEM WITH ELECTRONICALLY ASSISTED APPLICATION AND RELEASE

William W. Banker, Watertown, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Aug. 20, 1976, Ser. No. 716,057
Int. Cl.[2] B60T *15/32, 15/52*
U.S. Cl. 303—36 3 Claims



1. A fluid pressure brake system for a rail vehicle, comprising:

a brake pipe for conveying pressure signals for brake application and release through said vehicle;

a supply reservoir located in said rail vehicle;

a brake cylinder pipe located in said rail vehicle for conveying pressurized fluid to friction brakes in said vehicle;

a control valve responsive to the pressure in said brake pipe for directing pressurized fluid from said supply reservoir to said brake cylinder pipe to apply said friction brakes and for releasing pressurized fluid from said brake cylinder pipe to release said friction brakes; and

electrically operable release valve means interconnecting said brake pipe and said supply reservoir for repressurizing said brake pipe during release of said friction brakes, whereby accelerated brake release is achieved.

4,052,111
BOGIE-WHEEL SHAFT LUBRICATION SYSTEM

Harry L. Baker, 7087 4th St., Lakeport, Mich. 48060

Filed Nov. 20, 1975, Ser. No. 633,635
Int. Cl.[2] B62D *55/10*
U.S. Cl. 305—14 2 Claims

1. A suspension assembly for the resiliently biased rolling support of an endless track on a vehicle chassis, said suspension assembly comprising:

first and second trailing frame assemblies, each having a pair of axially spaced tubular sleeves at one end; said frame assemblies being positioned such that said tubular sleeves are axially aligned and alternately positioned;

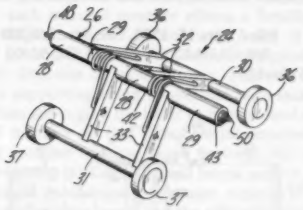
a cylindrically spaced bearing shaft positioned through said axially aligned tubular sleeves;

bolts extending through said chassis and axially into threaded engagement with the opposite ends of said shaft to secure said shaft to said chassis and for pivotally attaching said trailing frame assemblies to said chassis, said bolts having longitudinal through bores;

spaced supports rotatably carried by the other end of each of said trailing frame assemblies such that said supports are capable of free rotating movement with respect to its associated trailing frame assembly;

means which cooperate with said trailing frame assemblies to resiliently urge said supports downwardly with respect to said vehicle against the inner surface of said track;

said bearing shaft having first and second noncommunicating axial passageways opening respectively at the opposite



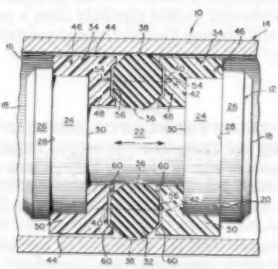
ends of said bearing shaft and communicating with the inner ends of said bolt bores; and

grease fittings carried at the outer ends of said bolt bores and communicating with said shaft first and second axial passages, each of said axial passages extending from its associated grease fitting into said shaft to intersect with a plurality of axially spaced diametrically extending passages opening at one side of said shaft at locations corresponding to the locations of said axially spaced tubular sleeves for communicating grease stored within said axial passages to the outer surface of said shaft for providing lubrication of the interface between the outer surface of said shaft and the inner surface of said tubular sleeves.

4,052,112
PISTON SEAL

Klaus Faber, Manchester, N.H., assignor to Disogrin Industries, Inc., Manchester, N.H.

Filed May 14, 1976, Ser. No. 687,387
Int. Cl.[2] F16J *15/24*
U.S. Cl. 308—3.5 12 Claims



1. A seal assembly for use on a piston having a piston seal groove with spaced shoulders formed therein comprising a deformable sealing ring adapted to be maintained in the groove and having inner and outer peripheral sealing portions, and side surfaces, said sealing ring being comprised of a homogeneous thermosetting elastomeric material having a relatively high shear modulus and being wear, tear, and abrasion resistant; and a pair of unitary bearing means, each of which is juxtaposed opposite said side surfaces of said sealing ring and

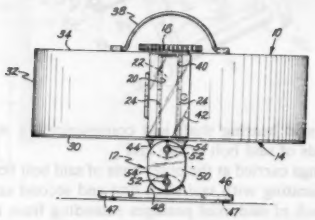
being made of a wear-resistant material which is harder than said material of said sealing ring, each of said bearing means includes bearing section means, and support section means, said bearing section means being adapted to be seated on a corresponding shoulder formed in the piston groove for providing a bearing support for said seal assembly, and said support section means contacting said sealing ring and including generally concave surface means which generally conform to at least portions of said side surfaces of said sealing ring for preventing extrusion and twisting of said sealing ring.

4,052,113

TAPE CASSETTE HOLDER FOR VEHICULAR USE

Larkey Wilburn Broome, P.O. Box 288B, Rte. 2, Sumrall, Miss. 39482

Filed Apr. 15, 1975, Ser. No. 568,329
Int. Cl.[2] A47B *81/06, 91/00, 81/06*
U.S. Cl. 312—11 **8 Claims**



1. A tape cassette holder comprising:
a. a housing having top, bottom and side walls;
b. a cassette loading opening in at least one of said walls;
c. an array of elastomeric material mounted for rotation as a unit within said housing, said array being disposed to form the entire and sole sidewalls of a plurality of radially extending tape cassette receiving cavities within said housing, the minimum transverse width of each of said cavities being smaller than the maximum thickness of a cassette intended to be received therein and the elastomeric material forming the sole structure between cassette receiving cavities;
d. a generally planar turntable means mounted within said housing;
e. said array of elastomeric material being secured to a surface of said turnable means for rotation therewith as a unit;
f. means connected to said turntable from a position externally of said housing for rotating said turntable means and said array of elastomeric material.

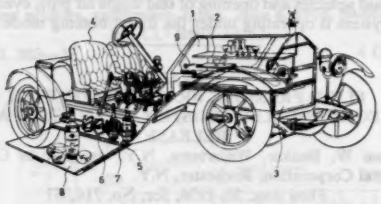
4,052,114

JALOPY SHELF FOR BOTTLES

Hsu Yun Tung, and Tzong Ren Wu, both of Taipei, China /Taiwan, assignors to Hsu Yun-Tung, Teipe, China /Taiwan

Filed Jan. 20, 1976, Ser. No. 650,773
Int. Cl.[2] A47B *95/02;* A47F *5/08;* A47B *17/04, 97/00*
U.S. Cl. 312—245 **1 Claim**

1. A decorative shelf for storing wine bottles and the like which resembles an automobile and comprises:
a frame formed to resemble a vehicle body with seats, runningboard, and engine compartment;
a hood pivotably connected to said frame for closing said compartment;
a plurality of shelves mounted within said compartment;
a track connected to said frame;
a drawer engaging said tracks for sliding movement below said compartment between a closed and open position;
a plurality of racks mounted on said frame between said seats and compartment and on said runningboard for supporting a plurality of bottles;
a second shelf movably mounted beneath said running board; and
at least one shelf hanging means including a first hanger plate fixed to said frame and including a bar, a second hanger plate adapted to be fastened to a wall at one end,



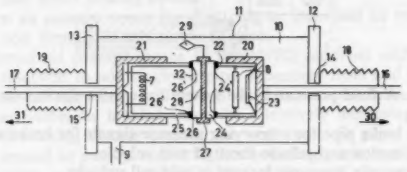
formed as a hook at the other end with a recessed groove formed in the hook end and having an aperture in the middle thereof, a bending link having a ball at one end extending through said aperture for permitting pivoting movement of said link, and means for engaging the other end of said link for holding said bar in said hook.

4,052,115

DEVICE FOR MANUFACTURING ELECTRON TUBE HAVING A RADIATION-SENSITIVE LAYER

Bernard Louis Pierre Jean, Fresnes, France, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 596,660, July 17, 1975, abandoned.
This application July 22, 1976, Ser. No. 707,496
Claims priority, application France, Aug. 2, 1974, 72.26925
Int. Cl.[2] H01J *9/34*
U.S. Cl. 316—31 **1 Claim**



1. A device for manufacturing an electron tube having an envelope assembled of a tubular portion and a window portion hermetically sealed together, a system of electrodes within said envelope and a radiation sensitive layer provided on said window portion, said device comprising: a common container in which a first and a second evacuated container are accomodated, means operable to maintain said common container evacuated said first container including means to construct the radiation sensitive layer on the window portion and being temporarily closed by that window portion using a first vacuum seal of a gallium containing material in the liquid state, said second container consisting of the tubular portion including the system of electrodes and being temporarily closed by an auxiliary closing member using a second vacuum seal of the gallium containing material in the liquid state, said device having two shafts extending collinearly through respective apertures in opposed walls of the common container, the shafts having at their ends which are within the container holders holding said first and second containers respectively, the device further comprising a third holder disposed between the holders at the ends of said shafts and which is operable to hold the window portion of the tube envelope and to hold said auxiliary closing member, means operable to move said first and second shafts longitudinally whereby the first and second vacuum seals are broken by moving the shafts longitudinally apart while leaving the window portion and the auxiliary closing member in the third holder, means operable to rotate

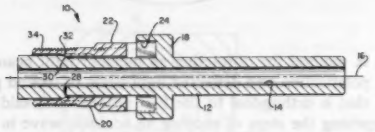
the third holder about an axis perpendicular to the shafts whereby the window portion having the radiation sensitive layer constructed thereon is rotated to face the then open end of the tubular portion of the tube envelope, and means creating a final vacuum seal consisting of the gallium containing material in the liquid state by moving the shaft holding the tubular portion towards the third holder effecting pressured contact between the window portion and the opened end of the tubular portion.

4,052,116

SWIVEL CONNECTOR FOR AN ARC GOUGING TORCH

Harold D. Sanders, and Thomas C. Landreth, both of Houston, Tex., assignors to Central Welding Supply Co., Inc., South Houston, Tex.

Filed Oct. 27, 1976, Ser. No. 736,075
Int. Cl.[2] H01R *39/00*
U.S. Cl. 339—8 R **13 Claims**



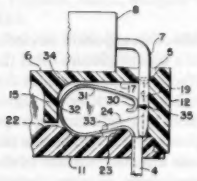
1. A swivel connector comprising:
a shaft having an axis therethrough;
a collar attached to said shaft; and
a sleeve mounted on said shaft and moveable from a first to a second position relative to said axis, said sleeve having a first and a second axial end thereon;
said collar having a first and a second axial end thereon, said second axial end of said sleeve being adjacent to said first axial end of said collar;
said sleeve in said first axial position being rotatable relative to said shaft, said sleeve in said second axial position being engaged with said collar and non-rotatable relative to said shaft;
said collar having an opening provided in said first axial end, said sleeve having a key member disposed on said second axial end, said key member being sized to fit with said opening in said collar, said key being disposed within and received by said opening in said collar when said sleeve is in said second axial position.

4,052,117

INTEGRATED CIRCUIT SOCKET

John N. Tengler, Chardon; Stephen A. Mesaros, Mentor, and John T. Venaleck, Painesville, all of Ohio, assignors to A P Products Incorporated, Painesville, Ohio

Filed Oct. 20, 1975, Ser. No. 623,672
Int. Cl.[2] H01R *11/22, 23/02*
U.S. Cl. 339—17 CF **6 Claims**



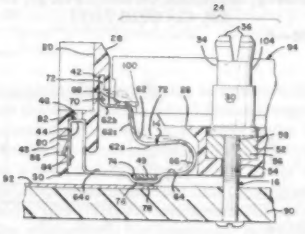
1. An electrical connector, comprising:
an electrically non-conductive housing having an interior compartment, and opening means in the former for access to the latter;
electrical contact means in said compartment for engaging a member inserted through said opening means;
said electrical contact means including a curved connecting portion in said compartment for movement by and wiping engagement with such member upon insertion thereof and for binding engagement with the latter to resist withdrawal thereof, and means for movably supporting said connecting portion relative to said opening means for such engagement with such inserted member, sai means for movably supporting comprising a curved resilient support portion coupled by a relatively straight lateral arm portion to said connecting portion, said means for movably supporting being resiliently deformable by force applied thereto via said connecting portion by insertion of such member, and wherein movement of said connecting portion by such inserted member effects a bending in said curved resilient support portion with travel of said connecting portion in a direction substantially parallel to the insertion direction of such member, and said means for movable supporting being cooperable with said connecting portion for urging the latter to engagement with such inserted member so that upon partial removal of such inserted member friction forces between the latter and said connecting portion urge said lateral arm to a position of increased mechanical advantage relative to such inserted member thus increasing the effective binding force exerted on such inserted member and resistance to withdrawal thereof; and
ramp surfaces in said housing for limiting the extent of such bending and travel.

4,052,118

CONTACT CARRYING SPRING MEMBER

William Samuel Scheingold, Palmyra, and Frank Christian Youngfleish, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 582,315, May 30, 1975, abandoned. This application Oct. 4, 1976, Ser. No. 729,547
Int. Cl.[2] H05K *1/12*
U.S. Cl. 339—17 CF **3 Claims**



1. A contact-carrying spring member to be positioned in an insulating housing for providing an electrical path between a integrated circuit package to a printed circuit board or the like, which comprises, a length of conductive material formed into a generally C-shaped configuration and having an upper and lower flexible beams connected to each other by an arcuate bight with the full extent of the upper beam overlying the lower beam, the lower beam being horizontal with a downwardly projecting jog positioned intermediate the ends, said jog having on its outside surface a contact adapted to engage a circuit on a printed circuit board, the upper beam comprising first and second horizontal sections, said first section being displaced upwardly from said second and integrally joined thereto by a vertical section, said first section having a free end thereon, a contact positioned on the outside surface of the first section adapted to engage a circuit pad on an integrated circuit package which may be positioned on the housing, further, said free end on the first section being rounded so that as a package is loaded into the housing, said upper beam may be deflected

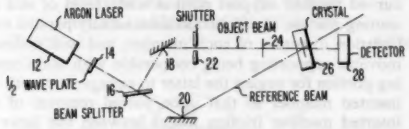
downwardly with the rounded free end sliding down a vertical sidewall of the housing.

4,052,119

CRYSTALS FOR RECORDING PHASE HOLOGRAMS

Brown F. Williams, Princeton; William Joseph Burke, Princeton Junction; William Phillips, Princeton, and David Lloyd Staebler, Lawrenceville, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,598
Int. Cl.² G03H *1/02*; G03C *1/00*; G11B *7/24*
U.S. Cl. 350—3.5 **4 Claims**



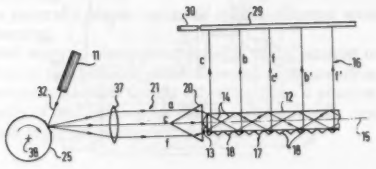
1. A single crystal useful for recording phase holograms which comprises a crystal selected from the group consistng of lithium niobate and lithium tantalate, said crystal prepared by doping with iron and from 50 to 300 parts per million of silicon wherein said crystal contains from 0.005 to 0.25 mole percent of iron.

4,052,120

OPTICAL APPARATUS FOR PRODUCING A LIGHT CURTAIN

Erwin Sick, Icking, and Klaus Hartman, Munich, both of Germany, assignors to Erwin Sick Optik-Elektronik, Waldkirch, Germany

Filed Dec. 29, 1975, Ser. No. 644,910
Claims priority, application Germany, Feb. 26, 1975, 2508366
Int. Cl.² G02B *27/17*
U.S. Cl. 350—6 **36 Claims**



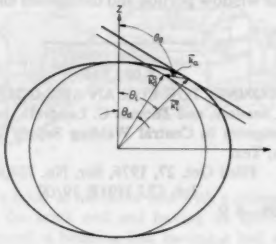
36. An optical apparatus for producing a light curtain, having a light source emitting a collimated beam of light, and a light distribution system, guiding the light beam over the curtain area, comprising a transmitting fiber optic rod having two end faces, one of said end faces receiving at least one light beam entering at an angle to the axis of the rod, means for introducing said light beam at said angle, a system of adjacent inclined mirrors, said mirrors inclined at an angle to the rod axis such that said light beam striking them is deflected towards the curtain area with said system located on the surface of the rod remote from the curtain area, a receiving fibre optic rod, disposed on the same side of the curtain area as the transmitting fiber optic rod, parallel to and beside the latter, and an elongated retro-reflecting region located on the other side of the curtain area, said retro-reflecting region having a scattering range adequate for illumination of the receiving fiber optic rod.

4,052,121

NONCOLLINEAR TUNABLE ACOUSTO-OPTIC FILTER

I-Cheng Chang, Sunnyvale, Calif., assignor to Itek Corporation, Lexington, Mass.

Filed Sept. 10, 1975, Ser. No. 612,055
Int. Cl.² G02F *1/33*; G02B *5/20*
U.S. Cl. 350—149 **20 Claims**



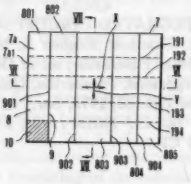
1. A method for diffracting an incident light beam with a first polarization to a deflected light beam of second polarization that is orthogonal to the first polarization, said method comprising the steps of exciting an acoustic wave in an optically birefringent crystal; passing the light beam through said crystal in a direction that is noncollinear with the group velocity of the acoustic wave; and selecting the direction of the acoustic wave such that the acoustic wavevector is in the same azimuth plane as the wavevector of the incident light, and in the said azimuth plane, the tangents to the locus of the wavevectors for the incident and diffracted light are parallel.

4,052,122

CORRECTING LENSES UTILIZED IN THE MANUFACTURE OF FLUORESCENT SCREEN OF COLOR PICTURE TUBES

Eiichi Yamazaki, Ichihara; Iwao Ogura, Kurume; Toshio Ueda, Mobara; Koichi Maruyama, Mobara, and Kenji Shimizu, Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 29, 1972, Ser. No. 310,477
Claims priority, application Japan, Nov. 29, 1971, 46-95333; Oct. 19, 1972, 47-6963
Int. Cl.² G02B *3/02*
U.S. Cl. 350—189 **10 Claims**



1. A correcting lens of an exposure device utilized to form a fluorescent screen of a colour picture tube, the correcting lens having effective surfaces on opposite sides thereof, each effective surface comprising a plurality of regions divided by a plurality of border lines and each having a specified refractive characteristic to exposure light, said border lines on the respective sides dividing one effective surface of the correcting lens in a direction different from another direction in which the opposite effective surface of the correcting lens is divided, and being discontinuous in only one direction the regions on said opposite sides being inclined in substantially different directions to provide said specified refractive characteristic such that the exposure light path through the correcting lens ap-

proximates the ultimate electron beam locus by cooperation of the regions on one side of the correcting lens with those on the opposite side thereof.

4,052,123

CORRECTING LENSES UTILIZED IN THE MANUFACTURE OF FLUORESCENT SCREEN OF COLOR PICTURE TUBES

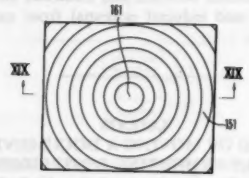
Eiichi Yamazaki, Ichihara; Toshio Ueda, and Koichi Maruyama, both of Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 310,477, Nov. 29, 1972. This application Sept. 29, 1975, Ser. No. 617,939

Claims priority, application Japan, Jan. 19, 1972, 47-6963; Nov. 29, 1971, 46-95333

Int. Cl.² G02B *3/02*

U.S. Cl. 350—189 **7 Claims**



1. A correcting lens of an exposure device utilized to form a fluorescent screen of a colour picture tube, the correcting lens having effective surfaces on opposite sides thereof, each effective surface comprising a plurality of regions divided by a plurality of border lines and each having a specified refractive characteristic to exposure light, said border lines on the respective sides dividing one effective surface of the correcting lens in a direction different from another direction in which the opposite effective surface of the correcting lens is divided, and being discontinuous in only one direction, the regions on said opposite sides being inclined in substantially different directions to provide said specified refractive characteristic such that the exposure light path through the correcting lens approximates the ultimate electron beam locus by cooperation of the regions on one side of the correcting lens with those on the opposite side thereof, and wherein said correcting lens comprises a plurality of regions, at least one portion of the effective surface on one side of said correcting lens having a plurality of concentric border lines which are discontinuous in the radial direction for dividing said regions.

4,052,124

REARVIEW MIRROR ASSEMBLY WITH PLURALITY OF SIMULTANEOUSLY MOVABLE MIRRORS

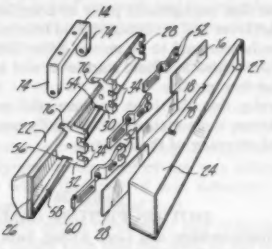
Konrad H. Marcus, Holland, Mich., assignor to Prince Corporation, Holland, Mich.

Filed Feb. 6, 1976, Ser. No. 655,688

Int. Cl.² G02B *5/08*

U.S. Cl. 350—304 **5 Claims**

1. A rearview mirror assembly comprising; a support member, a plurality of mirrors, a plurality of mounting means connecting said plurality of mirrors, respectively, to said support member for movement relative thereto about separate pivot axes disposed generally vertically, the pivot axes of said mirrors being disposed in spaced parallel relation to each other, and means connecting said mirrors to each other so that movement of one mirror relative to said support member results in simultaneous movement of the remaining mirrors in the same direction about their respective axes, and a bracket member adapted for mounting on a vehicle and means connecting said support member to said bracket member for movement of said



support member relative to said bracket member about a generally horizontal axis.

4,052,125

STARTING AND STOPPING DEVICE FOR SOUND MOTION PICTURE CAMERA

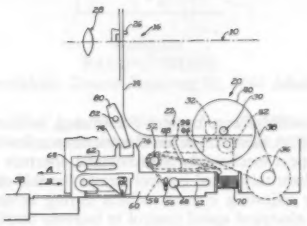
Takao Ishibashi, Higashiyamato, Japan, assignor to Nihon Beru-Haueru Kabushiki Kaisha, Higashimurayama, Japan

Continuation of Ser. No. 488,870, July 15, 1974. This application Apr. 19, 1976, Ser. No. 678,275

Claims priority, application Japan, July 31, 1973, 48-90966

Int. Cl.² G03B *31/02*

U.S. Cl. 352—29 **1 Claim**



1. In a motion picture camera having an exposure station and a sound station through which a sound film is transported for simultaneous recording thereon of pictures at the exposure station and sound at the sound station; a film loop being defined by the film in a path between the stations; a film transport mechanism for intermittently moving film through said exposure station and a film transport mechanism displaceable into and out of film engagement for constantly moving the film through said sound station by respective motor means; and a starting and stopping device for controlling said film transport mechanisms comprising:

camera actuating means movable between a first position for camera operation and a second position for camera inoperation;

a pivotable start lever displaceable from a first orientation to a second orientation responsive to displacement of said camera actuating means from said first position to said second position;

slide plate means driven by said movable camera actuating means and including means for engaging and positioning said start lever from one of said orientations to the other of said orientations after initial movement of said camera actuating means from a corresponding one of said positions toward the other of said positions;

biasing means coupled to an end of said start lever opposite said slide plate means engaged end for causing complete movement of said start lever upon at least partial movement of said camera actuating means from one position

toward another following initial displacement by said slide plate means; and

means connected to said camera actuating means for causing said displaceable film transport mechanism to be moved into film engagement prior to complete actuation of said start lever and actuation of said intermittent film transport mechanism and to be moved from film engagement prior to de-actuation of said start lever and said latter film transport mechanism;

whereby the film loop between the exposure and sound stations is maintained substantially constant upon starting and stopping of the camera.

4,052,126

MOTION PICTURE CAMERA

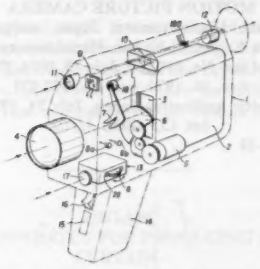
Otto Freudenschuss, and Gerd Kittag, both of Vienna, Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed Jan. 23, 1976, Ser. No. 651,823

Claims priority, application Austria, Jan. 24, 1975, 522/75

Int. Cl.² G03B *41/00*

U.S. Cl. 352—84 **17 Claims**



1. A motion picture camera comprising, in combination, a film transport mechanism, an electric motor for driving said film transport mechanism, an automatic aperture control circuit, an electronic speed control circuit for said motor, a first actuatable adjusting element which during actuation conditions said electrical speed control to increase continuously the speed of said motor to a first selected speed level, a second actuatable adjusting element which during actuation conditions said electrical speed control to decrease continuously the speed of said motor to a second selected speed level, means in said speed control circuit for resetting said motor speed to said normal film transport speed when the operation of said camera is terminated, and a picture frequency indicator for displaying the selected picture frequency accessible to the camera operator at least during the operation of the camera.

4,052,127

DEVELOPING SYSTEM

Shoji Kuroishi, Yokohama; Tsuguo Kimura, Zushi; Masami Emoto, Yokohama, and Shiro Yamamoto, Tokyo, all of Japan, assignors to Ricoh Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 435,270, Jan. 21, 1974, abandoned. This application July 7, 1975, Ser. No. 593,293

Claims priority, application Japan, Jan. 24, 1973, 48-10033; May 7, 1973, 48-51007

Int. Cl.² G03G *15/06*

U.S. Cl. 355—3 DD **10 Claims**

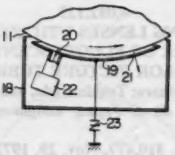
1. A developing system for electrophotographic copying apparatus for the type comprising:

a member having a surface of photosensitive material; and

means for forming an electrostatic latent image on said photosensitive surface by successive charging and exposure steps;

wherein the improvement comprises:

developing means for supplying a developer to said member to develop the latent image, said developing means comprising an electrode disposed in opposing relationship with the surface of said member with the developer interposed therebetween; and



means for permitting the induced potential on the electrode from said electrostatic latent image to float below a given value, said permitting means comprising constant voltage means connected between said electrode and ground for preventing said induced potential from exceeding said given value.

4,052,128

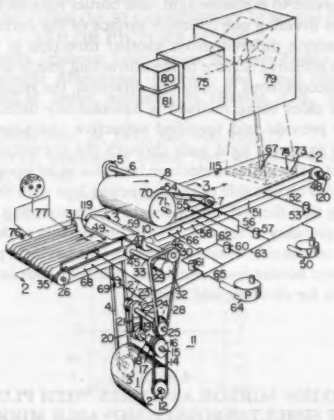
METHOD OF MOVING A DOCUMENT FOR STATIONARILY EXHIBITING BOTH SIDES THEREOF

John S. Burton, Los Angeles, and Ronald L. Whitney, San Fernando, both of Calif., assignors to Terminal Data Corporation, Woodland Hills, Calif.

Continuation of Ser. No. 405,354, Oct. 11, 1973, abandoned. This application Nov. 25, 1974, Ser. No. 526,491

Int. Cl.² G03B *27/32;* B65H *29/66*

U.S. Cl. 355—77 **3 Claims**



1. The method of moving a document for stationarily exhibiting both sides thereof, which includes, in order, the steps of;

a. planarly translating said document while flat forward over a path to an exhibiting position (67), and stopping it,

b. planarly translating said document while flat backward from said exhibiting position over substantially the same said path,

c. curvilinearly turning said document over while it is completing the backward translation,

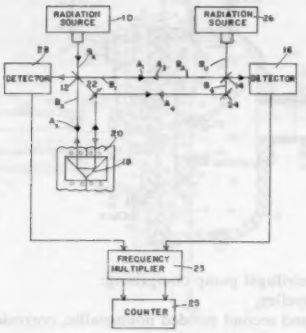
d. returning said document to said path at an inclination thereto, and

e. again planarly translating said document while flat forward over said path to the exhibiting position, and again stopping it.

4,052,129
METHOD OF AND APPARATUS FOR MEASURING THE WAVELENGTH OF A SOURCE OF RADIANT ENERGY

Arthur L. Schawlow, and Frank V. Kowalski, both of Stanford, Calif., assignors to Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed Aug. 9, 1976, Ser. No. 712,934
Int. Cl.[2] G01B 9/02
U.S. Cl. 356—106 R 10 Claims



1. The method of measuring the wavelength of radiant energy which comprises the steps of

generating a first beam of energy from a source of known frequency,

splitting said first beam to form two beams following two different paths,

varying the length of one of said paths, recombining said two split bams from said known source, detecting the number of fringes generated by the interference of said two beams as the one path length is varied,

generating a second beam from a source of unknown frequency, splitting said second beam to form two beams following two different paths,

varying the length of one of said second beam paths an amount corresponding to the variance of the path length of said beam from said known source,

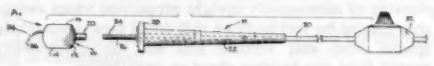
recombining said two beams from said unknown source, detecting the number of fringes generated by interference of said two beams from said unknown source as the path lengths are varied, and

comparing the number of fringes from the known source and unknown source beams.

4,052,130
WAX APPLICATION DEVICE

Bruce Jan Forman, 1101 Palms Blvd., Venice, Calif. 90291

Filed Dec. 1, 1975, Ser. No. 636,694
Int. Cl.[2] A46B 11/08; A47L 13/02; B43M 1/02
U.S. Cl. 401—2 27 Claims



1. An article for depositing a hot wax substance on a substrate in a desired pattern and which utilizes no external source of pressure for moving the substance, said article comprising:

a. a housing having a side wall and a bottom wall forming a reservoir therein for retaining a wax substance in a relatively liquid state,

b. handle means located on said housing,

c. spout means extending outwardly from said housing and extending downwardly therefrom and having an outer end terminating in an aperture capable of depositing said wax substance on said substrate,

d. a collecting tube communicating with said spout means and extending downwardly in essentially a vertical direction in said reservoir when said bottom wall is in an essentially horizontal plane and below the surface of a wax substance located in said reservoir and having a lower end terminating in an inlet opening somewhat in close proximity to said bottom wall,

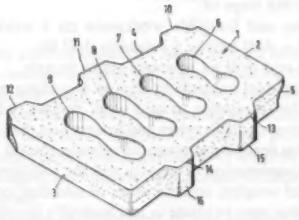
e. said collecting tube having a central duct of sufficiently small diameter to cause a type of capillary action therein to cause a capillary rise of the wax substance therein without an external source of pressure such that the level of the wax substance in said collecting tube will always be at least slightly above the level of the wax substance in said reservoir when the level of wax substance in said reservoir is essentially horizontal, and

f. arcuate connecting means connecting said collecting tube and said spout means such that the level of the wax substance in the collecting tube is below said arcuate connecting means but capable of entering the connecting means and spout means on tipping of the housing and without an external source of pressure, said spout means having a relatively small interior diameter approximating that of the collecting tube, so that when said housing is tilted downwardly in the direction of the end of said spout means and the outer end of the spout means is below the lower end of said collecting tube, the wax substance will flow evenly and smoothly in a controlled manner from said collecting tube through said connecting means and spout means to said substrate by a siphoning type action and which siphoning action and the flow of wax substance through said spout means will substantially immediately close upon tilting of the housing to its initial upright position.

4,052,131
PAVING STONE

Paul E. Lowrigkeit, Gruner Jagerweg 11, 3146 Adendorf, Germany

Filed Apr. 23, 1976, Ser. No. 679,855
Claims priority, application Germany, Apr. 30, 1975, 2519225
Int. Cl.[2] E01C 5/00
U.S. Cl. 404—34 10 Claims



1. A paving stone for stabilizing soils with natural plant growth, the paving stone comprising a slab of substantially even thickness and having substantially flat upper and lower surfaces, a pair of oppositely disposed side walls and a pair of oppositely disposed end walls, and a plurality of elongate apertures extending from the upper surface to the lower surface, the cross-section of the apertures increasing in size from the upper toward the lower surface, the side and end walls being withdrawn inwardly in downward direction toward the lower surface, said paving stone being characterized in that said slab including webs defined between adjacent apertures and the side and end walls each include an upper curved roof-type projecting edge, the walls of the apertures, as seen in cross-section, being arcuately bent inwardly toward their upper ends, and the side surfaces being curved outwardly toward their upper ends whereby the radius of curvature decreases toward the upper surface of the stone, one of said

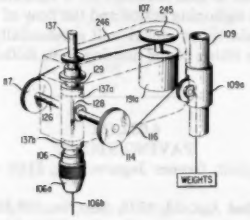
end walls is shorter than the other so that the body of the stone is of a substantially trapezoidal configuration, the end walls are parallel to each other and the elongate direction of the apertures extends parallel to the end walls so that when arranging several paving stones side wall to side wall with the shorter end walls of all stones on one side, and the longer end walls of all stones on the opposite side, the assembly of paving stones covers an arcuate area, and when arranging several paving stones side wall to side wall with the shorter end walls of the stones alternately disposed on one side and on the opposite side with respect to the longitudinal extension of the stone assembly, the paving stones cover a substantially straight-line area.

4,052,132

METHOD AND APPARATUS FOR DRILLING FINE HOLES IN FRANGIBLE WORKPIECES

William L. Oates, Mount Harmony Road, Bernardsville, N.J. 07924

Filed Nov. 10, 1975, Ser. No. 630,189
Int. Cl.[2] B23B *35/00*
U.S. Cl. 408—1 R **16 Claims**



11. A method of drilling holes or indentations in a frangible workpiece in accordance with a preselected program which comprises the steps of:

clamping said frangible workpiece on a work surface beneath a drill having a rotatable drill bit,

driving said drill bit to rotate about its axis,

operating dual controls to impose a pecking motion in said drill bit in relation to said work surface, wherein one of said dual controls raises and lowers said drill bit in vertical motion applying pressure in relation to said work surface by a combination of gravity and the addition and subtraction of weights, and the other of said dual controls drives a master cam to rotate in mechanically coupled relation to modulate the vertical motion of said drill bit,

the rotation of said cam and the excursions of said drill bit initiating relay operations to perform one or more functions in accordance with said program,

wherein the said relay operations include the following functions:

a. shifting the speed of rotation of said drill bit about its axis from an initial low rate to a high rate,

b. in synchronism with (a), subtracting weights in said one dual control to lessen pressure on the drill bit for its final descent into said workpiece,

c. at a point in the final descent of said drill bit just prior to contact with said workpiece, shifting the speed of rotation of said master cam from a brisk initial rate to a relatively low rate for the critical breakthrough period at the end of said program, and

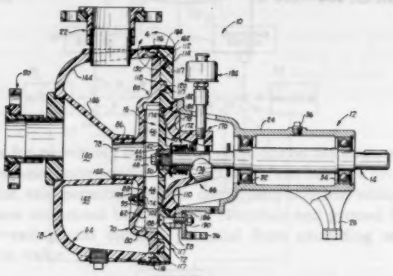
d. returning said drill including said drill bit to condition for reoperation.

4,052,133

CORROSION AND ABRASION RESISTANT CENTRIFUGAL PUMP

Tommy W. Yeater, Mansfield, Ohio, assignor to The Gorman-Rupp Company, Mansfield, Ohio

Filed Nov. 12, 1975, Ser. No. 631,216
Int. Cl.[2] F04D *7/06*
U.S. Cl. 415—200 **16 Claims**



1. A centrifugal pump comprising:

a. an impeller;

b. first and second molded nonmetallic, corrosion resistant, pumping chamber defining members;

c. one of said first and second members defining a volute wall portion bounding said chamber;

d. said impeller supported for rotation about an axis extending through said members and disposed in the chamber defined by said first and second members;

e. a cutwater between said first and second members and extending from said volute wall portion, said cutwater composed, at least in part, of a corrosion and wear resistant material; and,

f. means for connecting said cutwater to one of said first and second members, said connecting means comprising a bonding material between said cutwater and said one member;

g. one of said cutwater and one of said members including a projecting land portion and the other of said cutwter and said one member defining a groove conforming to and receiving said land portion, said bonding material disposed at least in part between said projecting land portion and said groove.

4,052,134

VERTICAL AXIS WIND TURBINE MOTOR

Rollin Douglas Rumsey, 148 Summer St., Buffalo, N.Y. 14222

Filed Jan. 15, 1976, Ser. No. 649,257
Int. Cl.[2] F03D *7/06*
U.S. Cl. 416—119 **28 Claims**

1. A wind power conversion turbine comprising:

a rotary body;

means supporting said body for rotation about a vertical axis;

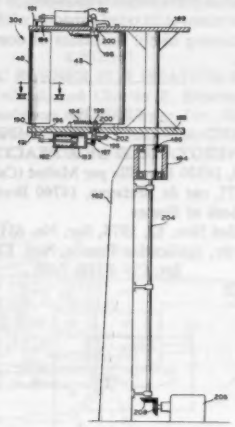
a plurality of substantially upright propulsion vanes swingably carried by said body on individual axes substantially spaced from said vertical axis and circumferentially spaced from one another about an open space;

said vanes having first generally radially outwardly facing surfaces and second generally radially inwardly facing surfaces, whereby the first surfaces propulsively intercept thrusting air on the windward side of said body and air passing between the spaced vanes and sweeping across the open space propulsively thrusts against said second surfaces of the vanes on the leeward side of the body, thereby converting wind energy into torsional force to drive the turbine rotatably about said vertical axis;

feathering means urging the propulsion vanes into tangential positon relative to the circumference of the turbine while allowing deflection of the propulsion vanes to the leeward under wind loads to limit torque developed by said vanes

to limit rotational speed of the turbine and to protect against damaging wind loads; and

a shock absorbing means having one end thereof secured to said body and having a second end connected to a pivot means, said pivot means comprising the individual axis for



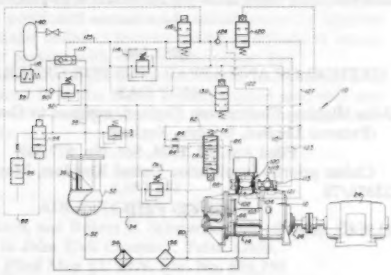
said propulsion vanes, wherein said shock absorbing means is arranged to retard wind induced swinging movements of the vanes away from their tangential position as relative wind direction shifts through each revolution of the rotary body.

4,052,135

CONTROL SYSTEM FOR HELICAL SCREW COMPRESSOR

John C. Shoop; Roger L. Post, and Michael G. Herschler, all of Quincy, Ill., assignors to Gardner-Denver Company, Dallas, Tex.

Filed May 11, 1976, Ser. No. 685,229
Int. Cl.² F04B *49/02, 49/08*
U.S. Cl. 417—295 **9 Claims**



1. A helical screw compressor and control system comprising in combination:

a helical screw gas compressor operably connected to deliver compressed gas to a service line and characterized by a casing having a pair of parallel intersecting bores, a gas inlet port, and a gas discharge port, a pair of intermeshing screw rotors disposed in said bores, auxiliary ports opening into said casing for bypassing a portion of the gas throughput of said compressor, and a rotary valve for opening and closing said ports to regulate the gas throughput capacity of said compressor;

a pressure fluid operated actuator for rotary said rotary valve;

an inlet throttling valve including pressure fluid operated actuator means for controlling the movement of said throttling valve to modulate the flow of inlet gas to said compressor;

control means responsive to a first pressure condition in said service line and including valve means for controlling the flow of pressure fluid to said actuator to cause said rotary valve to regulate the gas throughput of said compressor to maintain a substantially constant predetermined pressure in said service line from a full capacity operating condition to a first reduced capacity operating condition when the demand for compressed gas is less than the full capacity of said compressor;

a first pressure control valve for sensing the pressure condition in said service line and for providing a pressure signal to said valve means to effect the movement of said rotary valve when the pressure condition in said service line tends to vary from said predetermined pressure; and,

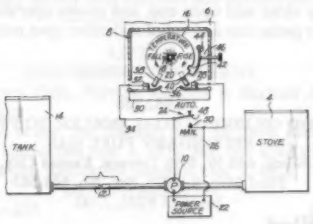
further control means including a second pressure control valve responsive to a pressure condition in said service line greater than the pressure condition required to effect movement of said rotary valve for providing a pressure signal to said actuator means to effect the throttling of inlet gas flow to said compressor by said throttling valve to further reduce the gas throughput of said compressor.

4,052,136

MARINE STOVE SAFETY CONTROLS

Ralph L. Ulricksen, Box 418, Sitka, Alaska 99835

Filed Mar. 22, 1976, Ser. No. 669,023
Int. Cl.² F23N *5/00*; G05D *23/00*
U.S. Cl. 431—77 **1 Claim**



1. In a safety control system for an oil burning heater having an oil supply conduit and control means therein for controlling flow of oil therethrough, the improvement comprising:

electrically operated means for actuating said control means;

temperature responsive thermostatic means positioned to sense a temperature that is indicative of the heat produced by said heater, said thermostatic means including a movable member;

means responsive to movement of said member to actuate said electrical means to stop flow of oil in said conduit when the sensed temperature reaches a predetermined low temperature or a predetermined high temperature;

manually releasable means engageable with said movable member to lock it in its position at said predetermined high temperature;

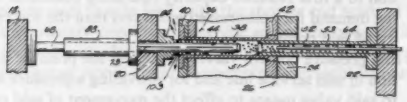
said member being mounted for rotation about an axis with pin means extending radially therefrom; said means responsive to movement of said member being switch means arranged in the path of movement of said pin means; and

said member being provided with a peripheral notch, said manually releasable means comprising a movable arm adjacent said member and having a portion projectable into said notch when said member is in said high temperature position, means biasing said arm toward said member, and means for manually retracting said arm from said notch.

4,052,137
CORE MOLDING MACHINE

Jurgen R. Pietzner, Sheboygan Falls, Wis., assignor to Kohler General, Inc., Sheboygan Falls, Wis.

Filed Nov. 4, 1975, Ser. No. 628,636
Int. Cl.² B29F 1/06
U.S. Cl. 425—577 19 Claims

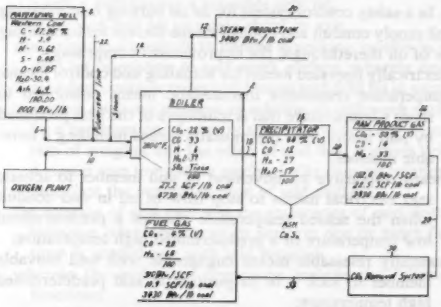


1. Core molding apparatus comprising a female die having a mold cavity therein which has two open portions positioned opposite each other, an end probe movably mounted adjacent to one open portion and movable into and out of said cavity through said open portion, the portion of said end probe which enters said cavity comprising a core end boundary surface, said end probe having a duct therein which communicates into said cavity when said end probe is within said cavity, means operable to move said end probe into and out of said cavity, means operable to feed plastic material into said duct when said end probe is within said cavity to fill said cavity with plastic material, a center probe movably mounted adjacent to the other open portion of said cavity and movable into and out of said cavity through said other open portion far enough to abut against the innermost end of said end probe, the portion of said center probe which enters said cavity comprising a core boundary surface, the end of said center probe comprising a plug coacting with the open end of said duct in said end probe to thereby close said open end, and means operable to move said center probe into and out of said other open portion of said cavity.

4,052,138
METHOD OF FIRING COAL BOILER TO PRODUCE SECONDARY FUEL GAS

Joseph F. Gieck, 645 W. 59th Terrace, Kansas City, Mo. 64113

Filed Mar. 8, 1976, Ser. No. 664,563
Int. Cl.² F23L 7/00
U.S. Cl. 431—4 5 Claims



1. A method of firing a coal-fired boiler as used in the production of steam comprising:

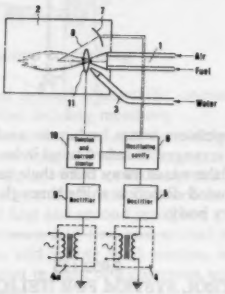
a. introducing coal in pulverized form into the firebox of said boiler in an amount greater than would be required to enable said boiler to produce steam at its rated capacity if an amount of oxygen were introduced sufficient to produce full combustion of said coal, and

b. introducing oxygen into said firebox, and burning said coal in the presence thereof, in quantities insufficient to produce full combustion of said coal, whereby the proportion of the total heat content of said coal released as heat by the resulting partial combustion of said coal is reduced, and the gaseous products of said partial combustion contain quantities of carbon monoxide which are combustible and may be utilized as fuel gas, and selecting proper coal-oxygen proportions, such that the amount of heat released by said partial combustion is sufficient to enable the boiler to produce steam at its rated capacity while still producing gases containing useful quantities of combustible carbon monoxide.

4,052,139
METHOD AND APPARATUS FOR IMPROVING THE ENERGY YIELD OF A REACTION

Pierre Paillaud, 14930 Eterville par Maltot (Calvados), and Joel Raymond, 177, rue de Bretagne, 14760 Bretteville sur Odon (Calvados), both of France

Filed Nov. 12, 1975, Ser. No. 631,226
Claims priority, application France, Nov. 12, 1974, 74.37320
Int. Cl.² F23B 7/00
U.S. Cl. 431—2 17 Claims

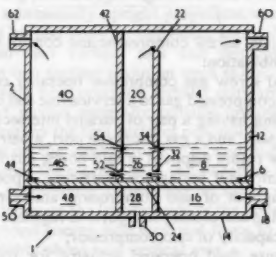


1. A method of improving the energy yield of a reaction between reactants, comprising providing electromagnetic radiation the frequency of which substantially corresponds to the maximum thermal or ionic motion of the molecules of said reactants, and directing said electromagnetic radiation towards said reactants while allowing the reaction to proceed.

4,052,140
METHOD OF AND APPARATUS FOR GENERATING A HOT GAS

John Highley, Cheltenham, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Apr. 19, 1976, Ser. No. 677,869
Claims priority, application United Kingdom, May 28, 1975, 23356/75
Int. Cl.² F23D 3/40
U.S. Cl. 431—7 8 Claims



1. A method of generating a hot gas including the steps of forming a first fluidised bed of particulate material, introducing

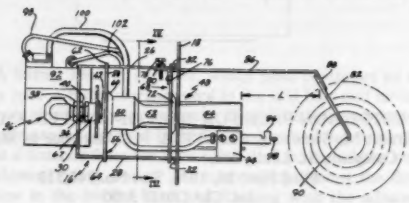
a fuel into the first bed, burning the fuel in the first bed to generate heat, forming a second fluidised bed of particulate material, passing a gas to be heated through the second bed, and circulating heat conductive particulate material between the first and second beds to heat the second bed to transfer heat to the gas passing therethrough thereby to generate a hot gas.

4,052,141

ATMOSPHERIC BURNER FOR HEATING FURNACES

Jay Dudheker, Holland, and Charles E. Isaacson, Hamilton, both of Mich., assignors to Lear Siegler, Inc., Holland, Mich.

Filed Aug. 21, 1975, Ser. No. 606,703
Int. Cl.[2] F23D *11/02*; F23C *5/02*
U.S. Cl. 431—167 **11 Claims**



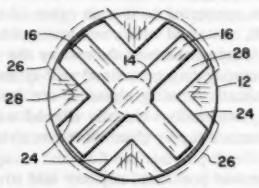
1. An inshot atmospheric gas burner assembly, comprising:
an orifice holder;
an open sided burner frame positioned on said orifice holder;
a venturi assembly having an inlet and an outlet supported by said burner frame in front of said orifice holder, the centerline of said venturi assembly being coincident with the centerline of said orifice holder;
a primary air shutter assembly adjustably disposed on said orifice holder for movement towards and away from said venturi assembly inlet to thereby define an adjustable primary air passage;
an annular collar positioned around and attached to said burner frame and adapted to attach the burner frame to a furnace;
a secondary air shutter assembly adjustably supported on said burner frame between said venturi assembly inlet and said annular collar and including an annular ring concentrically positioned around said venturi assembly adjacent said annular collar to thereby define an adjustable secondary air passage with said annular collar; and
a target assembly supported by said burner frame in line with and spaced from the outlet of said venturi assembly and adapted to be impinged upon by the flame from the burner assembly.

4,052,142

AIR VELOCITY BURNER

Robert D. Reed, and Robert E. Schwartz, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Filed May 17, 1976, Ser. No. 686,750
Int. Cl.[2] F23D *15/00*
U.S. Cl. 431—202 **10 Claims**



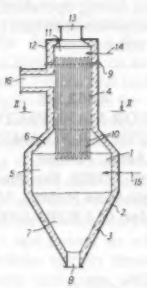
1. In a flare stack for the atmospheric combustion without smoke of waste combustible gases, said stack comprising an outer vertical cylindrical conduit, an inner smaller vertical conduit for the upward flow of combustible gases, and a burner connected to the top of the inner conduit, near the top of the outer conduit, the flow of primary combustion air being through the annular space between said outer and inner conduits;
the improvement comprising an air velocity burner comprising;
a. said burner comprising a plurality of radial arms, attached to said inner vertical conduit;
b. each of said radial arms including ports along its length, said ports directed upwardly of said arms;
c. a plurality of baffles equal in number to said plurality of radial arms; each baffle of the shape of a triangle with its base attached to the top edge of said outer cylindrical conduit; the peak angle of said triangle being substantially equal to the angle between adjacent radial arms of said burner, said baffles positioned symmetrically in the spaces between said arms;
d. each of said baffles including at least a triangular metal sheet substantially in the plane of said radial arms;
whereby the upward flow of primary combustion air is restricted to flow through the narros V-shaped spaced between the edges of said baffles and the sides of said arms;
whereby, because of the restriction in flow area, the flow of velocity of said primary combustion air is increased and there is turbulent mixing of said primary air and said fuel flowing from said ports; and
whereby the flow velocity of said primary air over the edges of said baffles causes secondary air to be inducted and turbulently mixed with said fuel and primary air.

4,052,143

GAS COMBUSTION PLANT

Jan Sandviknes, Oslo, Norway, assignor to Saxlund A/S, Akland, Norway

Continuation of Ser. No. 506,537, Sept. 16, 1974, abandoned. This application Apr. 6, 1976, Ser. No. 674,119
Claims priority, application Norway, Oct. 9, 1973, 733913
Int. Cl.[2] F23D *11/44*
U.S. Cl. 431—215 **5 Claims**



1. Gas combustion plant comprising a combustion chamber, a plate closing one end of said combustion chamber, a hood being mounted on said plate defining a mixing chamber having a gas inlet opening, a plurality of tubes each having an inlet end within said mixing chamber and extending through said plate into and longitudinally of a portion of said combustion chamber adjacent said plate and ending in an axially facing mouth orifice opening into said combustion chamber, said tubes being spaced apart from one another defining a space outside of said tubes within said combustion chamber with said space opening into the portion of said combustion chamber into which said tubes open to provide an open gas exchanging communication between said space and said portion of said combustion cham-

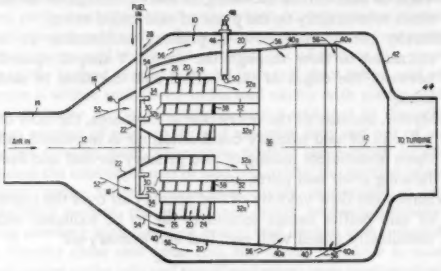
ber, said combustion chamber having an outlet for the hot combustion gases from said combustion chamber, positioned alongside said tubes whereby said gaswill flow through said tubes into said combustion chamber and the hot combustion gases will flow through said space outside of said tubes preheating the gas therein, to said outlet, said combustion chamber having a cylindrical portion merging into a flaring portion having flared walls and thus gradually increasing cross-section, said tubes being uniformly distributed over the cross-section of said cylindrical portion and extending into said flaring portion.

4,052,144

FUEL COMBUSTOR

Cecil J. Marek, Shaker Heights, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 31, 1976, Ser. No. 672,210
Int. Cl.[2] F34D *15/02*; F23R *1/00*
U.S. Cl. 431—352 **3 Claims**



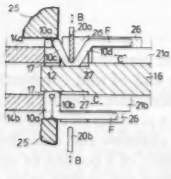
1. A combustor comprising an air flow inlet and an outlet, a fuel supply, a plurality of mixing chambers disposed in said combustor, a fuel inlet manifold for providing fuel at respective inlets of said mixing chambers, said chambers being in the path of air from said air flow inlet, a portion of the air from said air flow inlet bypassing said mixing chambers, a plurality of heat pipes each having one portion in the path of the fuel and air as it is mixed in a respective one of said mixing chambers and another portion downstream of said mixed air fuel adjacent the zone of combustion during operation, thereby in operation to transfer heat of combustion upstream of enhance fuel vaporization and complete combustion.

4,052,145

APPARATUS FOR MANUFACTURING SLIDE FASTENER FILAMENT

Turo Stenhall, 32740 Aetsa, Finland

Filed Mar. 1, 1976, Ser. No. 662,415
Claims priority, application Finland, Mar. 5, 1975, 750640
Int. Cl.[2] B29D *5/00*
U.S. Cl. 425—392 **7 Claims**



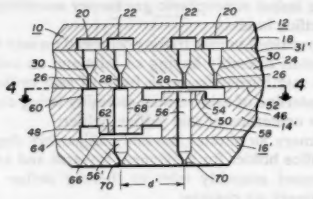
1. In an apparatus for manufacturing part of a slide fastener, a rotary setting gear wheel having a central axis and a pair of opposed side surfaces, a filament-deforming means for deforming an initially substantially straight filament portion into a portion of substantially V-shaped configuration, and a pusher means for pushing together, into side-by-side relation, legs of the V-shaped filament portion deformed by said deforming means, said deforming and pusher means both being situated in a radial plane which contains said axis and being substantially perpendicular with respect to each other, and moving means operatively connected on the one hand with said deforming means and on the other hand with said pusher means for moving said deforming means during deforming of a filament portion, substantially parallel to said axis at a location adjacent a peripheral edge of the gear wheel through one plane containing one of said side surfaces of the gear wheel toward another plane containing the other of the side surfaces of the gear wheel until an end of said deforming means is situated at the region of the latter plane, and for moving said pusher means substantially radially toward and away from said axis.

4,052,146

EXTRUSION PACK FOR SHEATH-CORE FILAMENTS

Ernest M. Sternberg, Chapel Hill, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 26, 1976, Ser. No. 745,333
Int. Cl.[2] D01D *3/00*
U.S. Cl. 425—463 **8 Claims**



1. An extrustion pack for production of sheath-core filaments comprising:

a stacked assemblege of a stream proportioning means, a stream conjugating means, and a spinneret means;

said stream proportioning means having first supply channels for receiving and discharging a first polymer to form sheaths and second supply channels for receiving and discharging a second polymer to form cores;

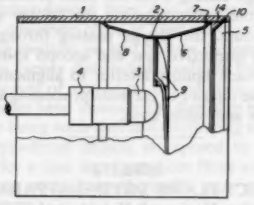
said stream conjugating means positioned adjacent said stream proportioning means has means defining upper and lower chambers, said upper chambers are connected to certain of said first supply channels, contained within said upper chambers are upper sheath forming channels defined by the juncture of said stream conjugating means and said stream proportioning means, said upper sheath forming channels are connected to certain of said second supply channels so that sheath polymer can flow and encapsulate said core polymer, stream discharge passages essentially vertically aligned with said certain of said second supply channels and connected to said upper sheath forming channels, said lower chambers have sheath passages connected to certain other of said first supply channels, contained within said lower chambers are lower sheath forming channels defined by the juncture of said stream conjugating means and said spinneret means, said lower sheath forming channels are connected to core passages essentially vertically aligned with certain other of said second supply channels for receiving core polymer so that sheath polymer can flow and encapsulate said core polymer; and positioned adjacent said stream conjugating means is spinneret means having capillaries in communication and essentially vertically aligned with respective stream discharge passages and core passages.

4,052,147

BURNER HEAD IN AN OIL BURNER

Jens Nyegaard, Larviksveien 20, 3290 Stavern, Norway

Filed July 14, 1975, Ser. No. 595,433
Claims priority, application Norway, July 15, 1974, 742576
Int. Cl.[2] F23D *13/40*
U.S. Cl. 431—354 5 Claims



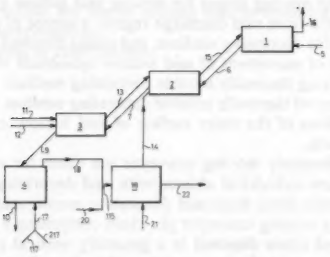
1. A burner head in a burner, which head comprises an air supply tube, a turbulator mounted in the said tube and having an oil nozzle arranged in the center line of the burner, wherein a ring element is arranged in the forward part of the air supply tube at a distance from the forward end of the turbulator, said ring element being conical and converging against the flow direction in the burner head and forming with the adjacent inner peripheral wall of the burner head a chamber which is closed in the direction of air flow along said peripheral wall, whereby air that flows along said peripheral wall is pressed into said chamber and turns and by means of said ring element is directed into the burner flame.

4,052,148

INTEGRATED REACTION PROCESS

Anthony Robin Pennell, Gravesend; Peter Leslie Dover, Rochester, and William Martin Davies, London, all of England, assignors to The Associated Portland Cement Manufacturers Limited, England

Filed Mar. 4, 1976, Ser. No. 663,753
Claims priority, application United Kingdom, Mar. 12, 1975, 10303/75
Int. Cl.[2] F24J *1/00*; F27B *19/00*
U.S. Cl. 432—1 17 Claims



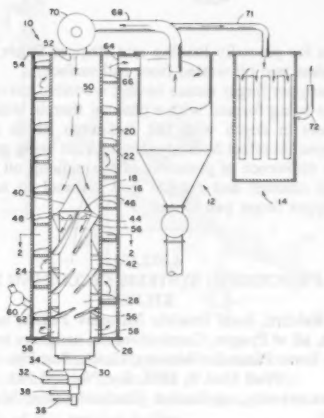
1. A thermal calcination process comprising the steps of:
a. passing raw material through at least one heating zone wherein heat energy is applied to produce endothermic change in the material;
b. passing the hot material treated in step (a) into a reaction zone wherein further heat energy is separately applied to produce exothermic change in the material;
c. passing the still hotter material treated in step (b) through a cooling zone and recovering a cooled reaction product therefrom;
d. supplying to said reaction zone a first source of heat energy in sufficient quantity and at a sufficiently high temperature to support said exothermic change; the said endothermic change of step (a) being all dependent upon at least one source of heat energy other than said first source;
e. supplying a second source of heat energy to a boiler and applying said heat energy for raising steam and thereafter for producing at least part of the endothermic change in said material in step (a);
f. augmenting said second source of heat energy by adding thereto heat recovered from at least one process zone including heat derived from the reaction zone; and
g. employing steam raised in the boiler for the generation of power.

4,052,149

CONTINUOUS CALCINER

Rodney A. Stiling, Snyder, N.Y., assignor to National Gypsum Company, Buffalo, N.Y.

Filed Sept. 2, 1976, Ser. No. 719,935
Int. Cl.[2] F27B *15/00*; F26B *17/00*
U.S. Cl. 432—58 5 Claims



1. Apparatus for uniformly heating a continuous supply of fine particles comprising an elongate cylindrical outer wall, a substantially coaxial elongate cylindrical inner wall within said outer wall, means for directing a flow of material spirally through the elongate space between said inner wall and said outer wall in a direction from a first end of said apparatus to a second end of said apparatus, means for supplying air to within the cylindrical inner wall and conveying said air within said inner wall from said inlet to said first end, means within said inner wall for heating said air within said inner wall, means at said first end for conducting said heated air from within said inner wall to between said inner wall and said outer wall, and means at said first end for continuously feeding said fine particles to be heated into said heated air whereby said heated air conveys said fine particles spirally through the length of said elongate space between said inner wall and said outer wall from said first end to said second end and uniformly heats all of said fine particles, means for removing said heated fine particles from said apparatus, means for separating said fine particles from conveying air and means for returning a substantial portion of said air to be reheated by said heating means.

4,052,150

OIL WETTED FUSER ROLL STRIPPING APPARATUS

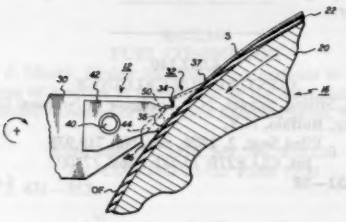
Eugene Behun, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 13, 1976, Ser. No. 750,790
Int. Cl.[2] B05C *11/00*
U.S. Cl. 432—60 5 Claims

1. In an apparatus for contact fusing toner particles to paper

support material wherein said apparatus comprises a fusing roll for applying heat and pressure to the particles and paper support material at a nip through which they are passed and which roll is coated with an oil film to prevent toner offset, an improved stripping apparatus for stripping sheets from the wetted fuser roll surface comprising:

stripper finger pad means positioned in close proximity to a moving oil wetted fuser roll surface at the nip exit from which copy sheets are to be stripped,



means for pivotally loading said stripper finger pad means against said oil wetted fuser roll surface,

said stripper finger means having a bottom curved pad surface being formed with a channel therein which channel tapers in depth with the maximum depth at the rear thereof to effect hydrodynamic forces being generated by the difference of pressures of the moving oil film within said channel and outside said channel to support said stripper finger pad means.

4,052,151

ORE-PROCESSING SYSTEMS INCLUDING ROTARY KILNS

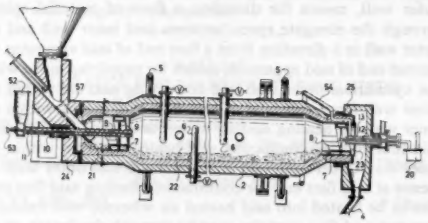
Vaclav Reichrt; Josef Smulek; Miroslav Pedlik, and Miloslav Alexa, all of Prague, Czechoslovakia, assignors to Vyzkumny ustav kovu, Panenske Brezany, Czechoslovakia

Filed Mar. 4, 1976, Ser. No. 663,712

Claims priority, application Czechoslovakia, Mar. 6, 1975, 1503/75

Int. Cl.[2] F27B *7/24, 7/08*

U.S. Cl. 432—115 **15 Claims**



1. In a charge processing system including a rotary kiln for heat-treating the charge in a controlled atmosphere, the kiln comprising a main cylindrical processing section in which the charge may be reacted with suitable reagents under elevated temperature and pressure, an inlet zone including a charge-receiving port disposed upstream of the main processing section, an outlet zone including a charge-withdrawal port disposed downstream of the main processing section, means for heating the interior of the main processing zone, first conduit means for introducing reagents into the main processing zone, second conduit means for withdrawing spent reaction gases from the main processing zone, and means for rotating the kiln, the improvement in which the upstream and downstream ends of the main processing section respectively comprise first and second self-contained hollow spiral ducts, the inner ends of the hollow interior of each of the first and second ducts communicating in gas-tight fashion with the interior of the main processing section, the outer ends of the hollow interior of the first and second spiral ducts individually communicating with the charge-receiving port and the charge-withdrawal port whereby charge introduced into the inlet zone enters the main processing section via the hollow interior of the first spiral duct and charge exiting from the main processing section is conducted to the outlet zone via the hollow interior of the second spiral duct, the charge passing through the hollow interior of the respective first and second spiral ducts completely filling such hollow interior to augment the gas-tight seal between the interior of the main processing section and the respective inlet and outlet zone.

4,052,152

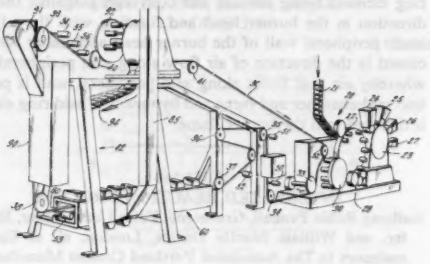
DIRECT FLAME DRYING APPARATUS

Edward J. Whelan, Hasbrouck Heights, and William L. Douma, West Paterson, both of N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Filed Feb. 18, 1976, Ser. No. 658,902

Int. Cl.[2] F27B *9/14*

U.S. Cl. 432—122 **28 Claims**



1. A system for decorating hollow cylindrical objects comprising, in combination:

a supply system for continuously supplying hollow cylindrical objects to a discharge region,

decorating means receiving hollow cylindrical objects from said discharge region and containing hollow cylindrical object moving means for moving said hollow cylindrical objects from said discharge region, a source of thermally settable decorating medium, and means disposed along the path of movement of said hollow cylindrical objects for applying thermally settable decorating medium from said source of thermally settable decorating medium to at least portions of the outer surface of said hollow cylindrical objects,

a continuously moving conveyor pin chain for conveying hollow cylindrical objects with said decorating medium thereon away from said decorating means; said continuously moving conveyor pin chain comprising a generally closed chain disposed in a generally vertical plane, and having spaced pins extending therefrom in a generally horizontal direction; each of said pins being adapted to receive a hollow cylindrical object thereon and to suspend and move said hollow cyiindrical object in the direction of movement of said pin and said chain,

a hollow cylindrical object transfer means for transferring cans from said decorating means to said conveyor pin chain after said hollow cylindrical objects have decorating medium applied thereto,

and a flame drying oven for thermally curing the decorating medium on said hollow cylindrical objects; said flame drying oven comprising an elongated chamber having gas fired burner head means disposed therein and operable to produce an open gas flame jet; said continuously moving conveyor pin chain being disposed to have a travel region

which is parallel to said elongated chamber, with said pins on said chain being disposed within said chamber and moving relative to said burner head means so that said open gas flame jet is applied directly to the decorating medium on the hollow cylindrical objects on said pins for a length of time sufficient to thermally cure said decorating medium;

said oven being spaced from said decorating means by a length of conveyor chain at least sufficient to permit the decorating medium on said hollow cylindrical objects to flow to an evenly distributed condition free of thickened ridges, the rate of movement of said chain, and the length of said burner head means in the direction of movement of said chain being such that said decorating medium on said hollow cylindrical objects is exposed to said open gas flame jet for a time less than about three seconds, and for a time long enough to thermally cure said decorating medium.

4,052,153

HEAT RESISTANT CRUCIBLE

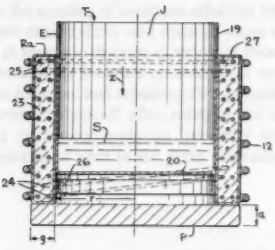
Werner J. Borer, Henggart; Tibor Kugler, Thayngen; Walter Schmidt, and Walter Stahlin, both of Schaffhausen, all of Switzerland, assignors to Prolizenz AG, Chur, Switzerland

Filed Feb. 26, 1976, Ser. No. 661,434

Claims priority, application Switzerland, Mar. 6, 1975, 2844/75

Int. Cl.² F27B *14/00, 14/10*

U.S. Cl. 432—156 **15 Claims**



1. A crucible, for use in heating and/or retaining melts at elevated temperatures,

comprising in combination:

a holding member composed of a heat-resistant material open at the bottom;

a fire-proof base-plate removably positioned below said holding member and operable to close said bottom; and

a thin-walled insert cup composed of a substance chemically resistant to oxygen and oxidizing substances and being removably supported in said holding member above said base-plate.

4,052,154

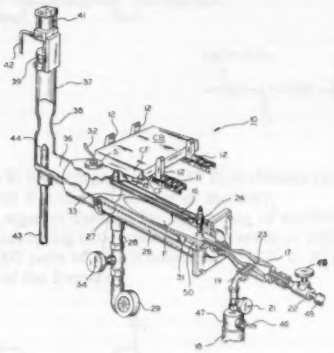
APPARATUS FOR HEAT SEALING OF CONTAINER BODIES

William J. Karpinsky, Audubon, Pa., assignor to Container Corporation of America, Chicago, Ill.

Filed May 28, 1976, Ser. No. 690,993

Int. Cl.² F24H *1/00*; F24J *3/00*

U.S. Cl. 432—222 **17 Claims**



1. In a machine for bonding selected surfaces of moving container bodies by the application of heat thereto:

a. Nozzle means for directing heated air against the selected surfaces of said moving bodies;

b. a tube for providing a supply of heated air connected to said nozzle means;

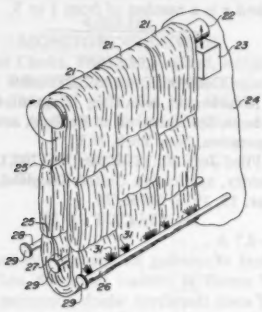
c. other means for introducing a temperature modulating source of air remote from the point where heated air is supplied to said tube to control the temperature of the air within said tube and at said nozzle means.

4,052,155

ASYMMETRIC SKEIN DYEING

Isadore Rosenthal, Levittown; Lawrence J. Exner, Ambler; Gregory J. Niksa, Collegeville; Warren I. Weiss, Southampton, all of Pa., and Maurice G. Young, Cinnaminson, N.J., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Dec. 17, 1975, Ser. No. 641,405
Int. Cl.[2] D06B *1/02, 11/00*
U.S. Cl. 8—14 17 Claims



1. A method for asymmetric dyeing of yarn, comprising positioning a skein of yarn for rotation in a vertical plane and while said skein is stationary, applying at least one color contrast dyestuff to at least one discrete location on said skein but to less than the number of locations effective for dyeing across the full width of said skein, said dyestuff being applied simultaneously to at least one discrete exterior location and to at least one discrete interior location on said skein corresponding to said exterior location, and repeating the application of the same or other contrast dyestuff after rotating the skein to one or more other stationary positions, whereby irregular dyeing along the lengths of yarn in the skein is obtained.

4,052,156

PROCESS FOR THE CONTINUOUS DYEING OF WOOL WITH METHYL TAURINO-ETHYLSULFONE DYES

Hans-Ulrich von der Eltz, Frankfurt am Main, and Joachim Walter Lehmann, Kelkheim/Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 6, 1974, Ser. No. 495,295
Claims priority, application Germany, Aug. 8, 1973, 2340044
Int. Cl.[2] D06P *5/17, 3/10, 1/38, 3/82*
U.S. Cl. 8—22 3 Claims

1. A process for the continuous dyeing of textile materials consisting of or containing wool with a reactive dyestuff according to a steam fixation method which comprises impregnating the fibrous material at pH values of from 6.5 to 7.5 with an aqueous liquor containing a reactive dyestuff which contains a methyltaurino-ethylsulphone group, and fixing the dyestuff without intermediate drying of the material by treating with saturated steam at temmperatures of from 110° to 120° C.

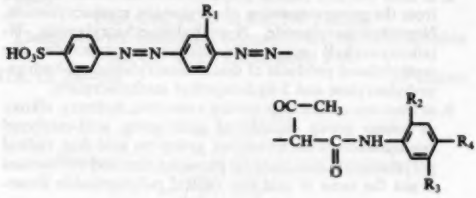
4,052,157

USE OF WATER-SOLUBLE DISAZO DYESTUFFS FOR DYEING OR PRINTING SYNTHETIC TEXTILE MATERIAL OF POLYAMIDE OR POLYURETHANE FIBERS

Hermann Fuchs, Kelkheim, Taunus, and Klaus Filzinger, Hofheim, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

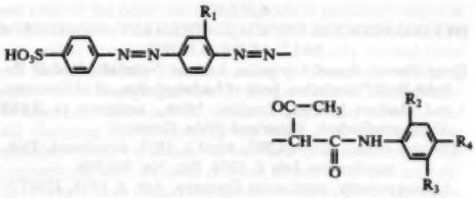
Filed Dec. 8, 1975, Ser. No. 638,647
Claims priority, application Germany, Dec. 9, 1974, 2458196
Int. Cl.[2] C09B *27/00;* D06P *1/02*
U.S. Cl. 8—41 R 5 Claims

1. A process for the dyeing or printing of a synthetic textile material consisting of or containing polyamide or polyurethane fibers, which comprises coloring the said textile material with a dyestuff of the formula



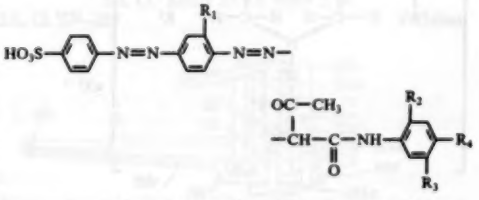
in which R_1 is hydrogen or $—SO_3H$, R_2 is chlorine or methoxy, and R_3 and R_4 each is hydrogen or methoxy.

4. An aqueous dyebath for the dyeing of synthetic textile material consisting of or containing polyamide or polyurethane fibers, 1000 parts of which consisting of 0.01 to 20 parts of a dyestuff of the formula



in which R_1 represents hydrogen or the sulfonic acid group, R_2 represents chlorine or methoxy, and R_3 and R_4 each represents hydrogen or methoxy, 0.05 to 10 parts of a usual dyeing auxiliary and 0.05 to 10 parts of a usual dispersing agent and, for adjusting the pH, 0.01 to 20 parts of an organic or mineral acid, and the pH value of the dyebath being from strongly acid to neutral.

5. An aqueous printing paste for the printing of synthetic textile material consisting of or containing polyamide or polyurethane fibers, 1000 parts of which consisting of 1 to 50 parts of a dyestuff of the formula



in which R_1 represents hydrogen or the sulfonic acid group, R_2 represents chlorine or methoxy, and R_3 and R_4 each represents hydrogen or methoxy, 250 to 650 parts of a usual thickening agent, 1 to 50 parts of a usual printing auxiliary, 1 to 50

parts of a usual dispersing agent and, for adjusting the pH, 5 to 50 parts of a salt of a weak base and a strong mineral acid or an organic acid, the deficit to 1000 parts being made up by water or thickening agent, and the pH value of the printing paste being from strongly acid to neutral.

4,052,158
TEXTILE FINISHING PROCESS

Edward D. Weil, Hastings-on-Hudson, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 410,643, Nov. 12, 1973, abandoned. This application Sept. 10, 1976, Ser. No. 722,854

Int. Cl.[2] D06M *1/00*

U.S. Cl. 8—116 P **11 Claims**

1. A process for producing a washdurable finish on a textile which comprises applying to the textile an effective amount of:

a. at least one free radical polymerizable monomer selected from the group consisting of acrylamide, methacrylamide, N-methylolacrylamide. N-methylolmethacrylamide. N-(alkoxymethyl) acrylamide, diacetone-acrylamide, the methylolated products of diacetoneacrylamide, 2-hydroxyethylacrylate and 2-hydroxyethyl methylacrylate;

b. at least one co-reactant having a reactive, hydroxy, alkoxy or amino group capable of undergoing acid-catalyzed condensation with a reactive group on said free radical polymerizable monomer (a) provided that said co-reactant is not the same as said free radical polymerizable monomer;

c. at least one free radical generating catalyst and at least one acid catalyst, or at least one catalyst having free radical generating and acidic chracteristics, and

d. subjecting said textile to curing conditions to conjointly effect free radical polymerization and acid-catalyzed condensation reactions.

4,052,159
DYEING PROCESS USING QUATERNARY AMMONIUM SALT AS RETARDER

Ernst Fuerst; Jozsef Gerendas, both of Neustadt; Rudolf Rokohl; Rolf Fikentscher, both of Ludwigshafen, all of Germany, and Herbert Helfert, Trenton, Mich., assignors to BASF Aktiengesellschaft, Rhineland-Pfalz, Germany

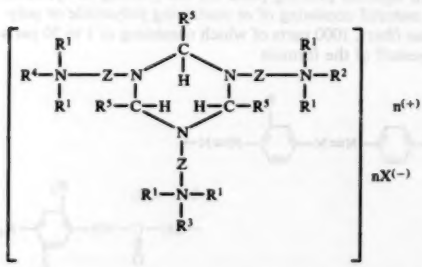
Division of Ser. No. 456,907, April 1, 1974, abandoned. This application July 6, 1976, Ser. No. 702,956

Claims priority, application Germany, Apr. 4, 1973, 2316725; Jan. 31, 1974, 2404511

Int. Cl.[2] D06P *5/06*

U.S. Cl. 8—169 **6 Claims**

1. In a process for dyeing an anionic polyacrylonitrile fibrous material with a basic dye in the presence of a retarder, the improvement which comprises using as the retarder in said dyeing process a salt containing quaternary ammonium groups and having the formula



in which each radical R^1 is a linear or branched and unsubstituted or hydroxyl-substituted alkyl of one to six carbon atoms or in which two radicals R^1 joined to a common nitrogen atom form therewith a heterocylic radical of four to seven carbon atoms; R^2, R^3 and R^4, respectively, are a cyclic, linear or branched, saturated or olefinically unsaturated and unsubstituted or hydroxyl-substituted alkyl of one to 30 carbon atoms or said alkyl is interrupted by one or more ether bridges, or an unsubstituted, chloro-substituted or alkyl-substitute phenyl or benzyl group of one to twelve carbon atoms in the alkyl substituents, and R^3 and R^4 may also be hydrogen or a free electron pair; R^5 is hydrogen or alkyl of one to four carbon atoms; Z is an unsubstituted or hydroxyl-substituted alkylene of two to six carbon atoms or said alkylene radical which is interrupted by ether groups; $X^{(-)}$ is the organic or inorganic anion of an alkylating agent; and n is a number of from 1 to 3.

4,052,160
CORROSION INHIBITORS

Barry Cook, Manchester; John Grey Dingwall, Sale, and Brian Martin Thomas, Stockport, all of England, assignors to Ciba-Geigy Corporation, New York, N.Y.

Filed July 20, 1976, Ser. No. 707,127

Claims priority, application United Kingdom, July 23, 1975, 30719/75; Apr. 13, 1976, 14966/76

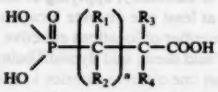
Int. Cl.[2] C23F *11/16*

U.S. Cl. 21—2.7 A **14 Claims**

1. A method of treating an aqueous system to inhibit the corrosion of metals in contact therewith and to inhibit the deposition of scale therefrom which comprises

adding to the aqueous system a minor proportion of a compound of the formula

(I)



wherein n is 0 or 1, and when n is 0, R_3 and R_4 are each hydrogen; or when n is 1, R_1, R_2, R_3 and R_4 are each hydrogen; or when n is 1, R_1, R_2 and R_3 are hydrogen, and R_4 is methyl.

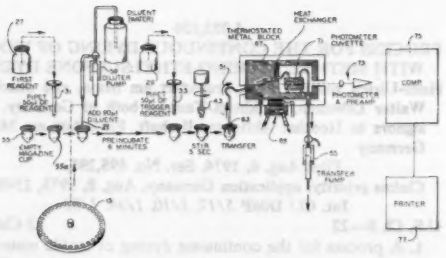
4,052,161
KINETIC ANALYZER

John G. Atwood, Redding; Hamilton W. Marshall, Jr., Ridgefield, and Peter H. Heinz, Trumbull, all of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 499,602, Aug. 22, 1974, abandoned. This application July 10, 1975, Ser. No. 594,951

Int. Cl.[2] G01N *33/16, 21/24, 21/26*

U.S. Cl. 23—230 R **49 Claims**



1. A method of performing a kinetic analysis in automatic analyzer apparatus comprising automatically carrying out steps comprising in the order stated:

a. pipetting a first reagent into a reaction cup;

b. diluting a sample to be analyzed into the cup;

c. preincubating the sample and first reagent together;

d. pipetting a second reagent into the cup;

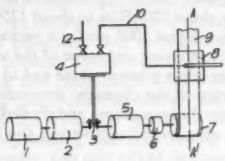
e. stirring the mixture to start a desired reaction;
f. transferring the reaction mixture to a photometer system;
g. continuously observing the absorbance of the reaction mixture for a predetermined observation period during continuance of the reaction;
h. computing the rate of change of absorbance over the full observation period; and
i. providing an output indication of the computed rate of change.

4,052,162

MONITORING DEVICE

John Robin Paul Clarke, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Mar. 31, 1976, Ser. No. 672,627
Claims priority, application United Kingdom, Apr. 8, 1975, 14317/75
Int. Cl.² G01N *21/12, 31/22*
U.S. Cl. 23—253 R **4 Claims**



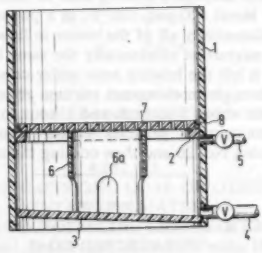
1. A monitor for fluids comprising: a casing; a porous indicator tape within the casing; a diaphragm pump within said casing, said pump having an inlet for drawing a fluid sample from outside the casing through a portion of the tape and into the pump and having a discharge outlet for discharging the fluid sample into the interior of the casing; a transport mechanism within the casing for advancing the tape so as to expose a fresh portion of the tape to the fluid sample; and a single electric motor within the casing for driving both the pump and the tape-transport mechanism.

4,052,163

PLASTIC VACUUM SUCTION FUNNEL

Alfred Patzner, Schwalbach, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 10, 1976, Ser. No. 694,826
Claims priority, application Germany, June 12, 1975, 2526295
Int. Cl.² B01D *23/28, 35/00*
U.S. Cl. 23—259 **3 Claims**



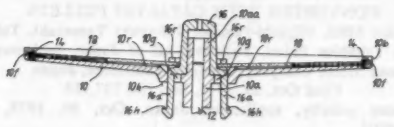
1. A vacuum suction filter comprising a generally cylindrical tube, a thrust ring mounted within said tube and tightly engaged therewith, a bottom wall mounted in one end of said tube and closing off said one end of the tube, a sieve plate support member seated on said bottom wall and extending therefrom to the level of said ring in said tube, and a perforated sieve plate seated on said thrust ring and said support member in spaced relation to said bottom wall to define a vacuum chamber in said tube, a first conduit connected in communication with said chamber through said tube adjacent said thrust ring for applying a vacuum to said chamber, and a second conduit connected in communication with said chamber through said tube and near said bottom wall to permit filtrate from said chamber, said bottom wall being inclined towards said second conduit; said tube, bottom wall, sieve plate and sieve plate support member all being formed of plastic materials.

4,052,164

APPARATUS FOR CENTRIFUGAL SEPARATION AND MEASUREMENT OF SAMPLES

Wolfgang König, Munich, Germany, assignor to Compur-Electronic Gesellschaft mit beschrankter Haftung, Munich, Germany

Filed Oct. 14, 1976, Ser. No. 732,218
Claims priority, application Germany, Nov. 26, 1972, 2553044
Int. Cl.² G01N *33/16;* B04B *5/00*
U.S. Cl. 23—259 **7 Claims**



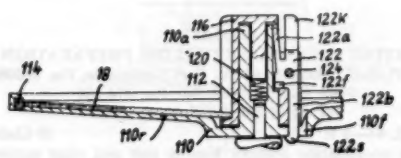
1. Apparatus for centrifugal separation of test samples in containers of tubular form open at both ends, said apparatus comprising a rotor of plate-like form having a plurality of radially extending recesses each being adapted to accommodate one of said tubular containers, resilient abutment means on said rotor at the outer end of each recess in position to serve as an abutment for the outer end of a tubular container laid in such recess, clamping means mounted centrally on said rotor and movable axially from a loading position to a clamping position, said clamping means forming a movable abutment for the inner ends of the tubular containers, said axial movement of said clamping means carrying the inner ends of the tubular containers from a position on one side of a transverse plane perpendicular to the axis of rotation of said rotor and containing the outer ends of said containers to a position on the opposite side of said plane, and said axial movement of said clamping means serving to displace a tubular container radially outwardly into tight sealing and clamping engagement with said resilient abutment means.

4,052,165

APPARATUS FOR CENTRIFUGAL SEPARATION OF TEST SAMPLES

Otto Wienchol, Pullach, and Franz Muhlbock, Munich, both of Germany, assignors to Compur-Electronic Gesellschaft mit beschrankter Haftung, Munich, Germany

Filed Oct. 14, 1976, Ser. No. 732,219
Int. Cl.² G01N *33/16;* B04B *5/00*
U.S. Cl. 23—259 **9 Claims**



1. Apparatus for centrifugal separation of test samples in containers of tubular form open at both ends, said apparatus comprising a rotor of plate-like form having a plurality of

radially extending recesses each being adapted to accommodate one of said tubular containers, resilient abutment means on said rotor at the outer end of each recess in position to serve as an abutment for the outer end of a tubular container laid in such recess, clamping means mounted centrally on said rotor and movable axially from a loading position to a clamping position, said clamping means forming a movable abutment for the inner ends of the tubular containers, said axial movement of said clamping means carrying the inner ends of the tubular containers from a position on one side of a transverse plane perpendicular to the axis of rotation of said rotor and containing the outer ends of said containers to a position on the opposite side of said plane, and said axial movement of said clamping means serving to displace a tubular container radially outwardly into tight sealing and clamping engagement with said resilient abutment means, characterized by the provision of a spring tending to maintain said clamping means in its loading position, and a latch for holding said clamping means in its clamping position against the force of said spring.

4,052,166

CONVERTER WITH CATALYST PELLETS

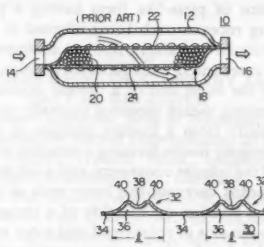
Yasuhiro Mita, Higashi-yamato; Takayuki Yamazaki, Tokyo, and Takahisa Izumi, Fujisawa, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Oct. 29, 1976, Ser. No. 737,155

Claims priority, application Japan, Oct. 30, 1975, 50-148390[U]

Int. Cl.² B01V *8/02*

U.S. Cl. 23—288 F **5 Claims**



1. A converter with catalyst pellets for catalytically treating the exhaust gases emitted from an internal combustion engine, comprising a container, an exhaust gas inlet at one end of said container, an exhaust gas outlet at the other end of said container, a catalyst pellet holding casing supported within said container so that the exhaust gases emitted from said engine through said inlet pass through said catalyst pellet holding casing before reaching said outlet, the catalytic pellet holding casing being provided at its walls with a plurality of louvers extending outwardly away from said casing, each of said louvers being formed with at least one channel shaped corrugation in substantially the top portion thereof, said channel shaped corrugation extending longitudinally with said louver so that the louver has a generally corrugated cross section.

4,052,167

HEATING UNIT AND FERTILIZER PREPARATION

David C. Goff, 3000 NE. 48 St., Fort Lauderdale, Fla. 33308

Filed July 24, 1972, Ser. No. 274,266

Int. Cl.² C10L *5/00*; A01G *13/00*

U.S. Cl. 44—1 R **19 Claims**

1. A combination outdoor heating unit and plant nutrient producing unit comprising:

a combustible mixture of a compressed mass providing a surface fire burning area,

said mass including a mixture of,

at least one compacted organic solid material, said organic material including a fuel that supports surface fire burning, and

at least one inorganic material, said inorganic material includes an automatic built-in force means dispersed throughout said mass to rid the surface of the mass of the oxidized surface layer material, and to remove small surface particles from said compressed mass as the surface of the mass burns to provide a plant nutrient by-product after the combination unit is burned.

4,052,168

PROCESS FOR UPGRADING LIGNITIC-TYPE COAL AS A FUEL

Edward Koppelman, 4424 Bergamo Drive, Encino, Calif. 91316

Filed Jan. 12, 1976, Ser. No. 648,170

Int. Cl.² C10L *9/00, 9/10*

U.S. Cl. 44—1 G **15 Claims**

1. A process for upgrading lignitic-type coals which comprises the steps of charging a moist lignitic-type coal into an autoclave, heating said lignitic-type coal to an elevated temperature of at least about 750° F up to about 1250° F and under a pressure of at least about 1000 psi for a period of time sufficient to convert the moisture and some of the volatile organic constituents therein into a gaseous phase and to effect a partial thermal restructuring of the chemical structure thereof and a change in its chemical composition, and thereafter cooling the lignitic-type coal charge and recovering the upgraded coal product.

2. The process as defined in claim 1, including the further step of contacting the lignitic-type coal charge with said gaseous phase during the cooling step to effect a deposition of the condensible organic constituents therein on the surface of said upgraded coal product.

13. The process as defined in claim 1, in which the step of heating said lignitic-type coal to an elevated temperature and pressure for a period of time is performed in a manner to effect a reduction in the sulfur content of said upgraded coal product.

4,052,169

TREATMENT OF SOLID FUELS

Edward L. Cole, Fishkill; Howard V. Hess, Glenham, and William F. Franz, Gardiner, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 20, 1975, Ser. No. 551,484

Int. Cl.² B02C *1/00*; C10L *9/10*; C10B *57/00*

U.S. Cl. 44—1 R **9 Claims**

1. A process for beneficiating and grinding solid fuel which comprises forming a mixture of particulate solid fuel having a majority of particles larger than U.S. Standard screen opening No. 20 and water, passing the mixture under conditions of turbulent flow through a heating zone to raise its temperature to between about 400 and 700° F. at a pressure sufficient to maintain substantially all of the water in liquid state, passing the heated mixture at substantially the same temperature and pressure as it left the heating zone under conditions of turbulent flow through an elongated attrition zone for a period of time between about 5 seconds and 1 hour to form a mixture having a majority of particles smaller than U.S. Standard screen opening No. 20 and then cooling the mixture.

4,052,170

MAGNETIC DESULFURIZATION OF AIRBORNE PULVERIZED COAL

Tsoung-Yuan Yan, Philadelphia, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed July 9, 1976, Ser. No. 703,717

Int. Cl.² C10L *9/10*; C10B *57/00*

U.S. Cl. 44—1 R **19 Claims**

1. A method for producing a rapidly burning fuel for large-scale electrical and steam generation by:

A. preheating a coal, having a high content of inorganic sulfur and 35–50 percent by weight of volatile matter on a

moisture-free basic, to a temperature high enough to enhance the magnetic susceptibility of said inorganic sulfur, while preventing agglomeration of said coal and while selectively retaining said volatile matter as a portion of said rapidly burning fuel, by:

1. disintegrating said coal to about 200 mesh to form pulverized coal while passing a stream of heated gas therethrough at sufficient velocity to entrain and fluidize said pulverized coal,
2. drying said pulverized coal and separating the dried coal from said heated gas within a fluidized stage to form dried pulverized coal, and
3. successively entraining said dried pulverized coal with a stream of hot oxygen-containing gas in sequential fluidized stages having successively higher temperatures, while passing said oxygen-containing gas countercurrently thereto, so that said dried pulverized coal is subjected to a final temperature of about 480°–600° C. and said inorganic sulfur has enhanced magnetic susceptibility;

B. magnetically removing at least a portion of said inorganic sulfur having enhanced magnetic susceptibility by passing said dried pulverized coal through a magnetic separator means to produce a beneficiated coal; and

C. entraining said beneficiated coal with a mixed oxygen-containing gas, which selectively contains all evolved volatile matter from said sequential fluidized stages, and controllably feeding said beneficiated coal, said evolved volatile matter, and said mixed oxygen-containing gas, as said rapidly burning fuel, to the combustion zone of a furnace used for said large-scale electrical and steam generation.

4,052,171

FUEL COMPOSITIONS AND ADDITIVE MIXTURES CONTAINING METHANETRICARBOXYLATES FOR REDUCING EXHAUST GAS CATALYST PLUGGING

Leonard M. Niebylski, Birmingham, Mich., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 584,141, June 5, 1975, Pat. No. 3,950,145. This application Dec. 22, 1975, Ser. No. 643,090

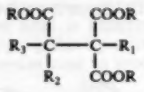
Int. Cl.² C10L *1/16*

U.S. Cl. 44—68 **40 Claims**

1. A gasoline composition for a spark ignited internal combustion engine comprising

i. an antiknock amount of a cyclopentadienyl manganese tricarbonyl antiknock, and

ii. an amount effective to reduce the plugging of an exhaust gas catalyst of a compound having the general formula



wherein R, R_1, R_2 and R_3 are independently selected from hydrogen, hydrocarbyl and substituted hydrocarbyl radicals.

4,052,172

PROCESS FOR GASIFYING COAL OR OTHER CARBON CONTAINING MATERIAL

Seiichi Shirakawa; Koji Iwahashi; Akio Nishi; Keisuke Honda, all of Nagasaki, Japan, and Kiyomichi Taoda, Hiroshima, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 1, 1975, Ser. No. 592,199

Claims priority, application Japan, July 3, 1974, 49-76010

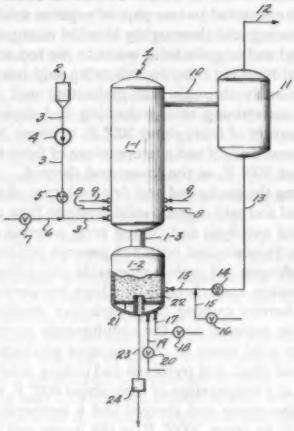
Int. Cl.² C10J *3/46*

U.S. Cl. 48—197 R **5 Claims**

1. A process for gasifying coal or other carbon containing material in which a gas stream communicates, comprising:

providing a fluidizing bed reactor chamber (1-2) disposed upstream and a jet-system reaction chamber (1-1) disposed downstream with respect to said gas stream,

providing means for supplying coal or other carbon containing material divided to 100–200 mesh (ASTM) and a gasifying agent selected from the group consisting of air and mixtures of air and steam (8,9) in sad jet-system reaction chamber (1-1), and



providing a dust removing device (11) at the exit flue (10) of said jet-system reaction chamber (1-1), said fluidizing bed reaction chamber (1-2) having a pipe means (13) for supplying collected solid of said dust removing device (11), means for supplying said gasifying agent (17), and means for taking out ashes (23).

4,052,173

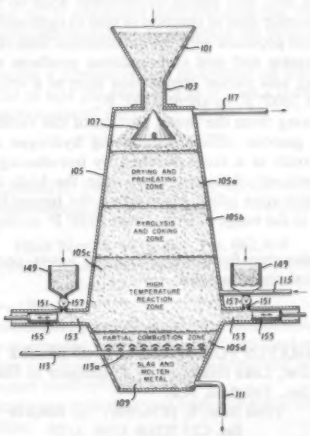
SIMULTANEOUS GASIFICATION OF COAL AND PYROLYSIS OF ORGANIC SOLID WASTE MATERIALS

Helmut W. Schulz, Harrison, N.Y., assignor to Dynecology Incorporated, Harrison, N.Y.

Continuation of Ser. No. 492,496, July 29, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 675,918

Int. Cl.² C10J *3/08, 3/16*

U.S. Cl. 48—202 **9 Claims**



1. A process for the production of gaseous effluent rich in

hydrogen and carbon monoxide from a feed mixture of coal-like material and organic solid waste, which process is carried out in a vertical reaction zone comprising, successively, a preheating and drying zone in the top portion thereof, a pyrolysis and coking zone, a high temperature reaction zone, and a partial combustion zone, which process comprises the steps of:

a. thoroughly blending said coal-like material and said organic solid waste in a ratio of 0.25 to about 2.5 parts of coal-like material to one part of organic solid waste;

b. introducing said thoroughly blended mixture of coal-like material and organic solid waste to the top section of said vertical reaction zone and allowing said mixture to flow downwardly through said preheating and drying zone while maintaining said preheating and drying zone at a temperature of from about 200° F. to about 500° F. at the upper end thereof and a temperature of from about 600° F. to about 900° F. at the lower end thereof;

c. allowing the preheated and dried mixture of said coal-like material and said organic solid waste to flow downwardly into said pyrolysis and coking zone wherein said mixture is directly contacted with hot gaseous products comprising hydrogen and carbon monoxide rising from the partial combustion zone through the high temperature reaction zone thereby causing the destructive distillation of said coal-like material and the simultaneous pyrolysis of said organic solid waste to carbonaceous products comprising coke and char, said pyrolysis and coking zone being maintained at a temperature of from about 600° F. to about 900° F. at the upper end thereof and a temperature of about 1600° F. to about 2000° F. at the lower end thereof;

d. allowing said carbonaceous products from said pyrolysis and coking zone to flow successively downward through said high temperature reaction zone and said partial combustion zone;

e. maintaining said high temperature reaction zone at a temperature of from about 2000° F. to about 2800° F.;

f. introducing into said partial combustion zone an oxidant gas containing at least about 75 percent by volume of oxygen to effect the partial combustion of a portion of said carbonaceous products thereby producing carbon monoxide and minimum amounts of carbon dioxide, the total quantity of said oxidant gas utilized in said vertical reaction zone being introduced into said partial combustion zone; g. introducing steam to said partial combustion zone to react with a remaining portion of said carbonaceous products thereby producing hydrogen and carbon monoxide;

h. controlling the amounts of steam and oxidant gas introduced into said partial combustion zone to balance the exothermic heat of reaction of said oxygen and said carbonaceous products with the endothermic heat of reaction of said steam and said carbonaceous products while maintaining said partial combustion zone at a temperature of about 2800° F. to about 3200° F.;

i. removing from the upper portion of the vertical reaction zone gaseous effluent containing hydrogen and carbon monoxide in a ratio enriched by introducing controlled amounts of additional steam into the high temperature reaction zone while maintaining the temperature of said zone in the range of from about 2000° F. to about 2800° F; and

j. withdrawing fused slag from the lower portion of the vertical reaction zone.

4,052,174

APPARATUS FOR SHARPENING BLADE EDGES

Felix R. Grat, Lake Hiawatha, N.J., assignor to Hacker Instruments, Inc., Fairfield, N.J.

Filed Mar. 8, 1976, Ser. No. 664,828
Int. Cl.² B24B *3/36, 3/50*
U.S. Cl. 51—81 BS **13 Claims**

1. Apparatus for sharpening blade edges, comprising:

a base;

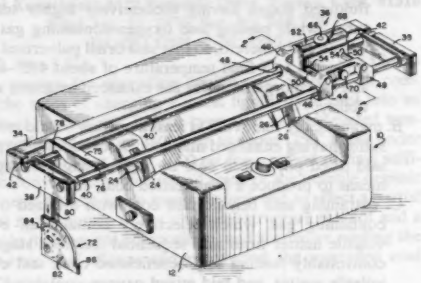
a pair of honing wheels supported on said base for rotation in parallel axes on a common plane;

said wheels being spaced apart to define a given void therebetween;

means coupled to said wheels for driving the latter in rotation; and

means coupled to said base for replaceably supporting a blade only perpendicular to said common plane; wherein

said blade supporting means includes means for moving a blade supported thereby in directions parallel to said axes, and in directions transverse to said axes and through said given void, to cause such a supported blade to sweep contactingly, and independently, across one of said wheels



to effect honing of one blade-edge side, and across the other of said wheels to effect honing of an opposite blade-edge side;

said blade supporting means comprising means for replaceably clamping and securing a blade thereto, said latter means having ways formed therein which extend longitudinally parallel with said axes, and guides also extending longitudinally parallel with said axes, said ways being slidably engaged with said guides; and

said guides are resilient, and are supported only at opposite longitudinal ends thereof, and yield under manual pressure applied to said blade supporting means transverse to said axes to move a blade supported thereby into greater contact with said wheels.

4,052,175

AUTOMATIC SNAG GRINDER

George T. Lott, and Harold J. Kiewert, both of Cincinnati, Ohio, assignors to Lott Tool Corporation, Cincinnati, Ohio

Filed May 3, 1976, Ser. No. 682,496
Int. Cl.² B24B *3/04, 9/06*
U.S. Cl. 51—96 **16 Claims**

1. An automatic snag grinder comprising a grinding wheel, first power means for actuating said grinding wheel, a platen to receive a workpiece thereon, centering-clamping means to hold said workpiece on said platen, second power means for rotating said platen at a selected speed and selected rotational torque, and positioning means to move said workpiece into grinding contact with said grinding wheel while said platen is

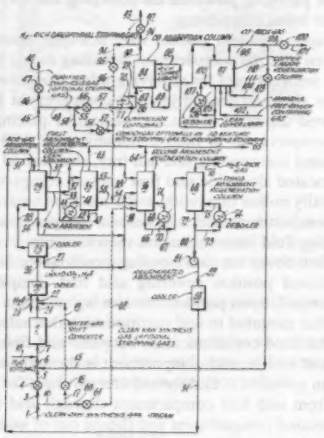
rotating on a center line approximately 90° to the axis of the grinding wheel, the relationship among said first power means, said centering-clamping means and said second power means being such that said platen will slow down to a predetermined torque load while said workpiece is clamped on said platen in contact with said grinding wheel and while said grinding wheel remains operative, said second power means returning in said platen to its selected speed of rotation when said workpiece moves out of substantial contact with said grinding wheel.

4,052,176

PRODUCTION OF PURIFIED SYNTHESIS GAS H_2-RICH GAS, AND BY-PRODUCT CO_2-RICH GAS

Edward T. Child, Tarrytown, N.Y.; Warren G. Schlinger, Pasadena, and George N. Richter, San Marino, both of Calif., assignors to Texaco Inc., New York, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,630
Int. Cl.[2] B01D *53/04, 53/14*
U.S. Cl. 55—32 **19 Claims**



1. A process of purifying a raw synthesis gas stream comprising H_2, CO, H_2O, CO_2, H_2S, COS, particulate carbon, and optionally CH_4, N_2 and A and producing a by-product stream of CO_2-rich gas for injection into an underground oil reservoir to effect secondary or tertiary recovery of oil comprising:

1. cooling said raw synthesis gas stream and removing said particulate carbon therefrom by contacting with water;
2. introducing the clean gas stream from (1) into a water-gas shift conversion zone in admixture with supplemental H_2O and reacting together a portion of the CO and H_2O in said shift conversion zone to produce additional H_2 and CO_2;
3. drying the process gas stream, cooling, and separating from said process gas stream about 0 to 70 volume % of the CO_2, H_2S, and COS;
4. contacting the process gas stream from (3) in an acid-gas absorption zone with a first liquid solvent absorbent to produce a rich first liquid solvent absorbent containing substantially all of the remaining CO_2, H_2S, and COS, and a product stream of purified synthesis gas comprising H_2, CO, and optionally CH_4, N_2 and A;
5. regenerating said rich first liquid solvent absorbent in a first absorbent regeneration zone by removing a CO_2-rich gas stream by the combination of stripping with a stripping gas selected from the group consisting of: (a) a portion of said raw synthesis gas, (b) a portion of the product stream of purified synthesis gas from (4), (c) a portion of a H_2-rich gas stream, and (d) mixtures of (a), (b) and (c); and at least one of the following: flashing, heating;
6. introducing at least a portion of said CO_2-rich gas stream in admixture with said stripping gas from (5) into a subterranean formation to effect secondary or tertiary recovery of oil.

19. In a process for producing synthesis gas, hydrogen-rich gas, and by-product CO_2-rich gas by reacting a hydrocarbonaceous feed by partial oxidation with a free-oxygen containing gas optionally in the presence of a temperature moderator in the reaction zone of a free-flow gas generator at a temperature in the range of about 1300° to 3500° F. and a pressure in the range of about 1 to 250 atmospheres to produce an effluent gas stream; cooling said effluent gas stream and removing particulate carbon therefrom thereby producing a clean process gas stream comprising H_2, CO, CO_2, H_2O, H_2S, COS and optionally CH_4, N_2, and A; introducing said clean, feed gas stream containing supplemental water into a water-gas shift reaction zone and reacting CO and H_2O to produce H_2 and CO_2; and removing CO_2, H_2S and COS in an acid-gas absorption zone with a first liquid solvent absorbent, thereby producing a rich first liquid solvent absorbent and a dry product gas stream free from acid gas; the improvement comprising:

1. contacting at least a portion of said dry acid gas-free product gas in a CO-absorption zone with a second solvent absorbent which absorbs substantially all of the remaining CO in said process gas stream, and thereby producing said H_2-rich product gas stream;
2. regenerating said second liquid solvent absorbent to produce a lean solution of said second liquid solvent absorbent and a by-product CO-rich gas stream;
3. recycling said CO-rich gas stream to said water-gas shift conversion zone to produce additional hydrogen;
4. recycling at least a portion of said lean solution of second liquid solvent absorbent to the CO absorption zone in (1);
5. regenerating a portion of said first liquid solvent absorbent in a regeneration zone by flashing, boiling, and stripping with a stripping gas obtained from within the process and selected from the group consisting of a portion of said clean process gas stream, a portion of said dry product gas stream free from acid gas, and a portion of said H_2-rich product gas stream, thereby producing a gaseous by-product stream comprising CO_2-rich gas in admixture with said stripping gas, and a first liquid absorbent containing H_2S and optionally COS;
6. boiling the first liquid solvent absorbent leaving (5) to produce an H_2S-rich stream and a lean first liquid solvent absorbent stream;
7. recycling said lean first liquid solvent stream to said acid-gas absorption zone; and introducing said H_2S-rich stream into a sulfur recovery zone;
8. introducing said gaseous by-product stream comprising CO_2-rich gas in admixture with stripping gas from (5) into a subterranean formation to facilitate the recovery of oil; and
9. introducing a portion of said recovered oil into the reaction zone of said gas generator as at least a portion of said hydrocarbonaceous feed.

4,052,177

ELECTROSTATIC PRECIPITATOR ARRANGEMENTS

Leif Kide, Gothenburg, Sweden, assignor to Nea-Lindberg A/S, Denmark

Filed Mar. 1, 1976, Ser. No. 662,416
Claims priority, application Denmark, Mar. 3, 1975, 845/75
Int. Cl.[2] B03C *3/02*
U.S. Cl. 55—139 **7 Claims**

1. An electrostatic precipitator circuit, comprising:

a voltage source for generating a unidirectional voltage;

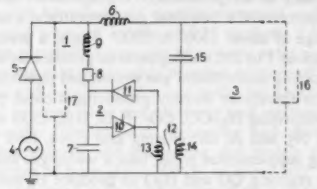
precipitator electrodes constituting a capacitor and responsive to said inidirectional voltage;

a pulse generator including a storage capacitor for generating pulses;

inductance means intercoupled between said storage capacitor and said precipitator electrode capacitor for transfer-

ring said pulses to said precipitator electrodes in superimposed relationship to said unidirectional voltage;

said storage capacitor, inductance means and said precipitator electrode capacitor forming a controllable LC oscillating circuit; and



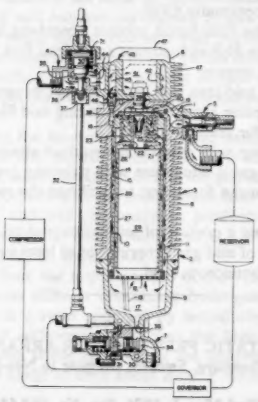
non-linear electric means for controlling said LC oscillating circuit to enable the energy stored in said precipitator electrode capacitor during each pulse transferred thereto to return to said storage capacitor for renewed storage therein.

4,052,178

COMPRESSED AIR FILTER ASSEMBLY

Virgil L. Frantz, Salem, Va., assignor to Graham-White Sales Corporation, Salem, Va.

Filed Sept. 2, 1975, Ser. No. 609,392
Int. Cl.² B01D *45/16*
U.S. Cl. 55—212 **15 Claims**



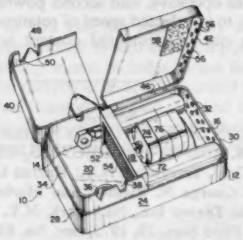
1. A filter assembly for a compressed air system having a reservoir and a compressor responding in pumping and idling cycles respectively to minimum and maximum predetermined pressures in the reservoir, said assembly comprising filter unit means connected between the compressor and reservoir for filtering air received from the compressor during the pumping cycle, outlet valve means for passing filtered air from said filter unit means to the reservoir only when said air is at a pressure above said maximum reservoir pressure, and means for reducing to saturation at the pressure in said filter unit means the moisture content of air passed therefrom.

4,052,179

PORTABLE, POCKET SIZE ASH TRAY

Norbert A. Kirk, 2970 Sheridan Rd., Chicago, Ill. 60657

Filed Aug. 11, 1976, Ser. No. 713,506
Int. Cl.² B01D *50/00*
U.S. Cl. 55—385 G **6 Claims**



1. A portable, powered air purifying ash tray for use with smoker items comprising:

an approximately pocket size, box-type housing having a first internal compartment including means for supporting a smokers item for receiving ashes from the smoker item, an enclosed second internal compartment having a covered top and bottom and means for placing said second compartment in fluid communication with the environment surrounding said ash tray, said second compartment located alongside said first internal compartment substantially in-line therewith, and a partition separating said first compartment and said second compartment and permitting fluid communication therebetween;

a first cover on said housing positionable between a first closed position covering said first compartment and a second, open position uncovering said first compartment;

a filter mounted to said partition such that substantially all of the fluid communication between said first compartment and said second compartment is through said filter;

a fan mounted in said second compartment for exhausting air from said first compartment through said filter into said second compartment and thence out of said compartment into the environment surrounding said ash tray through said means provided therefor;

a portable electrical power supply mounted in said second compartment being for energizing said motor; and

a control circuit for selectively coupling said power supply to said motor for the energizing thereof.

4,052,180

SOFT ICE CREAM MACHINE

V. Robert Erickson, 8015 SW. Oleson Road, Portland, Oreg. 97223

Continuation-in-part of Ser. No. 587,266, June 16, 1975, abandoned. This application Aug. 12, 1976, Ser. No. 713,699
Int. Cl.² A23G *9/20*
U.S. Cl. 62—188 **3 Claims**

1. An ice cream machine for making and dispensing soft ice cream comprising.

a. a freezing barrel having an outlet valve,

b. means in said freezing barrel for mixing ice cream at a selected capacity,

c. refrigerating means associated with said freezing barrel for cooling said barrel at a selected capacity,

d. a reservoir for ice cream mix,

e. upright tubular means establishing communication between said reservoir and a lower portion of said freezing barrel,

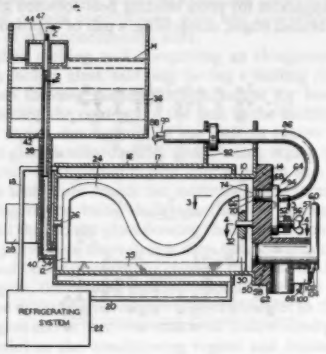
f. float means in said reservoir having buoyant support on the mix in said reservoir to follow the level of mix in the latter,

g. a hollow open-ended depending stem integral with said

float projecting down through said reservoir and therebelow into sliding engagement in said upright tubular means,

h. and means defining an opening in said stem for admitting ice cream mix to the stem for gravity flow into said tubular means and said freezing chamber as ice cream is drawn off through said outlet valve,

i. said opening being disposed in said stem below the level of mix in the reservoir and maintained at a constant height relative to the surface of the mix whereby a constant head pressure is maintained in said tubular means to said freezing barrel,



j. said opening being of a selected size such that the rate of flow therethrough is approximately equal to or slightly greater than the freezing and mixing capacity of said freezing barrel,

k. the open upper end of said stem being open to atmosphere to admit air into said mix.

l. an adjustable valve means which includes an open ended hollow tube mounted within said stem maintaining the upper end of said stem open to the atmosphere.

4,052,181

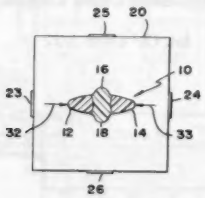
ACOUSTIC ENERGY SHAPING

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Taylor G. Wang, Glendale, and Daniel D. Elleman, San Marino, both of Calif.

Filed Feb. 13, 1976, Ser. No. 658,133

Int. Cl.[2] C03B *37/00, 15/14*

U.S. Cl. 65—2 **2 Claims**



1. A method for shaping a mass of material comprising:

suspending said mass in a gaseous atmosphere capable of transmitting acoustic energy;

applying heat to only a middle portion of said mass to melt only said middle portion;

applying acoustic energy to unmelted opposite sides of said mass to squeeze said melted middle mass portion between them; and

allowing said middle mass portion to solidify.

2. A method for shaping a mass of material, comprising:

suspending said mass in a gaseous atmosphere capable of transmitting acoustic energy;

heating at least a portion of said mass to a substantially molten state;

continually drawing a thread of said material from a substantially molten portion of said mass; and

applying acoustic energy to opposite sides of said drawn thread to flatten said thread into a ribbon while allowing it to cool.

4,052,182

PROCESS FOR PRODUCING AIR BLOWN GLASS FIBER STRAND MAT

Joseph P. Stalego, and William H. Rigby, Jr., both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 337,246, March 1, 1973, abandoned. This application Apr. 8, 1974, Ser. No. 459,135

Int. Cl.[2] C03C *25/02*

U.S. Cl. 65—3 C **11 Claims**

1. In the process of making mats of glass fiber strands, comprising the steps of attenuating molten streams of glass into fibers, gathering the fibers into strands, passing the strands over respective revolving wheels which wheels attenuate the glass fibers and deliver the strands downwardly to a moving foraminous collection surface, causing the strands to be traversed back and forth across the moving foraminous collection surface at a rate that is a fraction of the rate of the delivery downwardly by the revolving wheel, and depositing the strands upon the collection surface by air flow downwardly through the conveyor to form a mat, the improvement comprising contacting the fibers with an aqueous solution consisting essentially of water, an organosilane, a polyhydric alcohol adduct and an inorganic acidic salt, said acidic salt being present in said solution in an amount sufficient to improve the processibility of said fibers during attenuation.

10. A composition consisting essentially of

a. at least one glass fiber;

b. an organosilane;

c. a polyhydric alcohol adduct; and,

d. an acidic salt.

4,052,183

METHOD AND APPARATUS FOR SUPPRESSION OF POLLUTION IN TORATION OF GLASS FIBERS

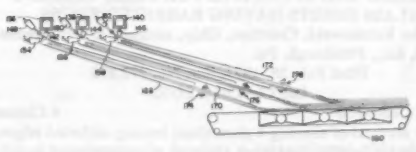
Marcel Levecque, Saint-Gratien, and Jean A. Battigelli, Rantigny, both of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation-in-part of Ser. No. 353,983, April 24, 1973, Pat. No. 3,874,886, which is a continuation-in-part of Ser. No. 456,878, April 1, 1974. This application Mar. 11, 1975, Ser. No. 557,281

Claims priority, application France, June 14, 1976, 75-04039

Int. Cl.[2] C03B *37/06; C03C 25/02*

U.S. Cl. 65—3 C **28 Claims**



1. Equipment for making resin bonded glass fiber blanket comprising a substantially closed fiber receiving chamber, a perforated fiber collecting conveyor defining at least a large part of a wall of said chamber, means for developing a gaseous blast in said chamber, means for developing a gaseous jet of smaller cross section than the blast, directed at an angle to the blast and penetrating the blast to produce a zone of interaction

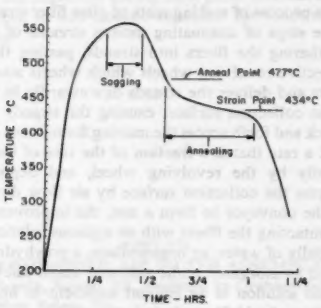
of the blast and jet, means for introducing molten attenuable material into said zone of interaction and thereby effect fiberization thereof in the receiving chamber, suction means behind the fiber collecting conveyor developing gaseous currents through the fiber collecting conveyor and thereby form a fibrous blanket on the conveyor, means for spraying water and curable resin binder material on the fibers, means for separating water with resinous material carried thereby from said gaseous currents, and means for recirculating the gases to and through the receiving chamber and the conveyor.

4,052,184

CONTOURING GLASS SEAL EDGE

Joseph W. Anderson, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,479
Int. Cl.² C03B *21/00*
U.S. Cl. 65—102 **8 Claims**



1. A method of conforming the seal edge of a one-piece glass article to a desired surface contour which comprises, providing a glass-ceramic sagging mold with a surface contour equivalent to the desired contour of said seal edge, positioning said one-piece glass article upon the contoured surface of such sagging mold, rapidly heating said mold and said glass article to a sagging temperature between the annealing point temperature and softening point temperature of the glass composition from which said article is formed, maintaining such temperature for a time sufficient to gravitationally conform said seal edge of said article to the contoured surface of said sagging mold, rapidly cooling said article to its annealing point temperature, maintaining said article in the transformation range between its annealing point temperature and strain point temperature for a time sufficient to inhibit the generation of internal surface stress on said article, and then rapidly cooling said article to handling temperature.

4,052,185

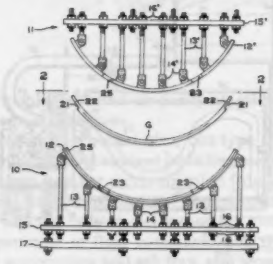
METHOD AND APPARATUS FOR PRESS BENDING GLASS SHEETS HAVING RABBETED EDGES

Anthony Kolakowski, Crestline, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 28, 1977, Ser. No. 772,893
Int. Cl.² C03B *23/02*
U.S. Cl. 65—106 **4 Claims**

1. A method of shaping a glass sheet having rabbeted edges, comprising: heating said glass sheet to a heat-softened condition suitable for bending, positioning the heat-softened glass sheet between opposed pairs of press bending members having shaping surfaces which face the glass sheet and are of complementary convex and concave curvature corresponding to the desired curvature for the glass sheets, moving said shaping surfaces together to apply bending fordes to the heat-softened glass sheet, wherein the initial bending force applied to the rabbeted marginal edge portions of the glass sheet is thourgh a compressible filler strip on the concave shaping surface aligned with the rabbeted marginal edge portions of the glass sheet, so that edge portions of the glass sheet initially compress the filler strip and thereby substantially avoid over-bending the rabbeted marginal edge portions of the glass sheet, continuing bringing the shaping surfaces together until brought ot bear against substantially all of the non-rabbeted portions of the glass sheet and said filler strip fills a substantial portion of the rabbet in the glass sheet, separating the shaping surfaces, an conveying the bent glass sheet from between the shaping surfaces.

2. An apparatus for press bending heat-softened glass sheets having rabbeted edges, comprising: a pair of opposed glass-facing shaping surfaces of complementary convex and concave curvatues corresponding to the desired curvature for the glass sheets, said shaping surfaces having sufficient rigidity to resist deformation during pressurized engagement with a heat-softened glass sheet, a compressible filler strip affixed to the concave shaping surface in a configuration adapted to fall into alignment with the rabbeted marginal edge portions of the glass sheets, said filler strip having sufficient compressibility to be slightly compressed by initial bending force exerted through edge portions of the glass sheets and having sufficient firmness to support the rabbeted marginal edge portions of the glass sheets in the final stage of bending, and means for moving said shaping surfaces into a glass engaging position and a retracted position.

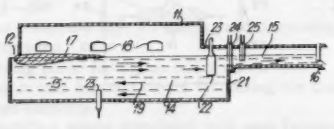


4,052,186

METHOD AND APPARATUS FOR CONDITIONING MOLTEN GLASS

William Jackson Rhodes, Prescot, England, assignor to Pilkington Brothers Limited, St. Helens, England

Continuation of Ser. No. 653,826, Jan. 30, 1976, abandoned. This application Oct. 15, 1976, Ser. No. 733,005
Claims priority, application United Kingdom, Jan. 31, 1975, 4359/75
Int. Cl.² C03B *5/22*
U.S. Cl. 65—137 **27 Claims**



1. A method of conditioning molten glass to achieve a desired thermal distribution in the glass suitable for feeding to a forming process, which method comprises feeding molten glass to the inlet end of an elongate conditioning zone in a container adapted to contain molten glass, establishing a flow of the molten glass through the conditioning zone in a direction from the inlet end of the zone towards a remote outlet from the zone at the opposite end thereof, with substantially no return flow, selectively cooling the molten glass adjacent the

inlet to the conditioning zone to reduce its temperature and achieve a desired temperature profile through the depth and width of a transverse cross-section of the glass adjacent the conditioning zone inlet such that on flowing through the remainder of the conditioning zone the further conditioning completes the transformation of the glass to a thermal condition suitable for feeding to a forming process, said cooling being effected, at a position selected in dependence on the temperature distribution within the glass and the required temperature profile, by passing cooling fluid through means located in the forward flowing body of the glass, said means, including at least one fluid cooled pipe comprising portions immersed in the molten glass and extending transversely along the bottom of said conditioning zone and upwardly through the depth of said conditioning zone.

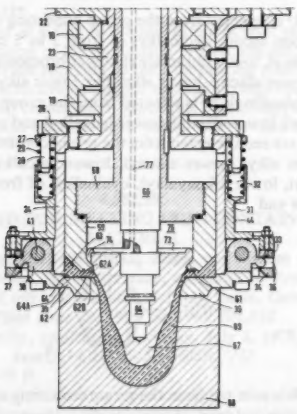
12. A glass melting tank comprising an elongated tank for containing molten glass, said tank having a melting region into which glass forming material is fed, means for heating and thereby melting the contents of the tank in the melting region, a refining region downstream of the melting region in which the molten glass is refined, and a conditioning region having an inlet adjacent the refining region and an outlet at a working end of the tank from which the molten glass is removed, the conditioning region being shallower than the refining region whereby all the molten glass flowing through the conditioning region may flow in a downstream direction towards the working end, and cooling means for cooling the glass in the conditioning region, the cooling means comprising at least one fluid cooled pipe extending across the base of the inlet to the conditioning region and at least one additional fluid cooled pipe at or near the inlet to the conditioning region and located in the body of the forward flowing glass at an adjustable position so as to achieve a desired temperature profile at or near the inlet to the conditioning region.

4,052,187

APPARATUS FOR PRODUCING GLASS PARISON BY THE PRESS-AND-BLOW PROCESS

Claus Spaeth, Wadgassen; Gunter Wilhelm, Bous, and Ingeborg Hammel, Schaffhausen, all of Germany, assignors to Villeroy & Boch Keramische Werke KG, Germany

Filed Dec. 8, 1975, Ser. No. 638,545
Claims priority, application Germany, Dec. 9, 1974, 2458233
Int. Cl.[2] C03B *9/00, 9/14, 11/00*
U.S. Cl. 65—160 **21 Claims**



1. An apparatus to be used in the production of a glass parison by a press-and-blow process in which a press mould and an annular gap surrounding said mould are to be filled with a change of glass melt, said apparatus comprising:

a plunger ring having a chamber therein;

a plunger movable in said plunger ring chamber for axial displacement relative to the press mould, said plunger when moved into said press mould defining therewith a shaping cavity; and

neck retaining ring means mounted to enclose a parison and tightly abut against said press mould in a sealing manner during pressing;

said plunger ring including a first surface portion on an axially outwardly facing end thereof and said retaining ring means including a first surface portion on an axially inwardly facing end thereof, when said plunger is in a molding position in said pressing mould said first surface portion of said plunger ring is spaced from said first surface portion of said retaining means to cooperatively define therewith said annular gap such that said annular gap surrounds the plunger and communicates with said press mould to receive glass melt forced from said mould by said plunger;

said plunger ring including a second surface portion laterally spaced adjacent its associated first surface portion and said retaining ring means including a second surface portion laterally spaced adjacent its associated first surface portion, said second surface portion of said plunger ring being spaced from said second surface portion of said retaining ring means and at least one of said second surface portions extending at an angle relative to its associated first surface portion so that when said plunger is in a moulding position in said press mould, said second surface portions are cooperatively arranged to define an enlarged, annular compensating chamber located radially outwardly of said annular gap and communicating therewith to compensate for the presence of an amount of charge which is in excess of that filling said shaping cavity and said annular gap, by receiving such excess.

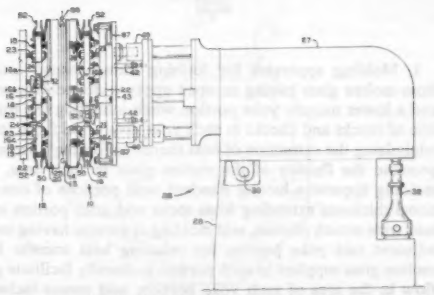
15. Apparatus according to claim **1** further including a photoelectric cell disposed a predetermined distance beneath said plunger for actuating a switch for movement of a blow mould in response to the parison sagging to said predetermined distance.

4,052,188

PRESS BENDING FIXTURE WITH IMPROVED ADJUSTING MEANS

Samuel L. Seymour, Oakmont, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 29, 1976, Ser. No. 745,909
Int. Cl.[2] C03B *23/02*
U.S. Cl. 65—273 **4 Claims**



1. An apparatus for bending a heat-softened glass sheet by sandwiching said glass sheet in pressurized engagement between glass facing surfaces of a pair of glass shaping members having complementary shaping surfaces conforming substantially to the shape desired for the bent glass and relatively movable between a retracted position and a glass engaging position, each glass shaping member comprising:

a relatively flexible shaping plate having a major surface

whose shape and areal extent approximates that of the shape and areal extent desired for the glass sheet after bending and having sufficient rigidity to resist deformation during pressurized engagement against a heat-softened glass sheet;

adjusting plate means including at least two relatively rigid plate segments which together occupy an area substantially coextensive with that of said shaping plate and are located in spaced relation behind and in facing relation to said shaping plate;

a relatively rigid back plate having an area substantially coextensive with that of said shaping plate and located in spaced relation behind and in facing relation to said adjusting plate segments;

a plurality of first connecting members fastened to each of said adjusting plate segments and to said relatively flexible shaping plate, each of said first connecting members including individual means for adjusting the distance between said shaping plate and the respective adjusting plate segment to thereby alter the shape of said shaping plate;

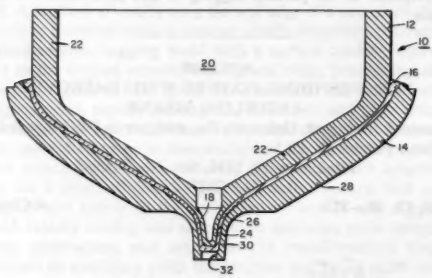
a plurality of second connecting members fastened to each of said adjusting plate segments and to said relatively rigid back plate, each of said second connecting members including individual means for adjusting the distance between the respective adjusting plate segment and said back plate.

4,052,189

APPARATUS FOR INHIBITING CHECKS AND CRACKS IN THE MOIL OR YOKE AREA OF TV FUNNELS

Stuart M. Dockerty, deceased, late of Corning, N.Y., by Robert C. Dockerty, executor, Poughkeepsie, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Aug. 5, 1976, Ser. No. 711,730
Int. Cl.² C03B *11/12, 9/38, 11/06*
U.S. Cl. 65—319 5 Claims



1. Molding apparatus for forming funnel-shaped articles from molten glass having an open upper wide mouth portion and a lower narrow yoke portion while inhibiting the formation of cracks and checks in such yoke area of said articles by minimizing the extraction of heat therefrom during forming to promote the fluidity of the molten glass in such area, said molding apparatus having standard wall portions of conventional thickness extending from about said yoke portion up to said wide mouth portion, said molding apparatus having means adjacent said yoke portion for reducing heat transfer from molten glass supplied to such portion to thereby facilitate glass flow in the area of such yoke portion, said means including relatively thin-wall portions adjacent said yoke portion compared with the thickness of the remaining standard wall portions, and said thin-wall portions being of the same material as that of the remaining wall portions whereby said thin-wall portions extract less heat from the molten glass in contact therewith than the remaining wall portions extract from the molten glass in contact therewith and thereby facilitating the fluidity of the molten glass in the yoke area so as to inhibit the formation of cracks or checks in the yoke portion of the formed funnel-shaped articles.

4,052,190

SUSTAINED-RELEASE PLANT FOOD

Julius F. T. Berliner, Chicago, Ill., assignor to Burnishine Products Inc., Skokie, Ill.

Filed Apr. 26, 1976, Ser. No. 680,453
Int. Cl.² C05G *3/04*
U.S. Cl. 71—11 8 Claims

1. A solid substantially anhydrous controlled-release fertilizer composition adapted to release water-soluble constituents at a rate substantially proportional to the amount of water applied thereto comprising a physically bound mixture of:

water soluble nutrient fertilizer constituents;

a colloidal resinous material having the property of reversibly swelling into a water-insoluble permeable gel surface layer in the presence of water;

a gel promoting and sustaining agent therefore; and

a sufficient amount of a sequestering agent to solubilize and promote the migration of said trace elements through said permeable surface layer in the presence of water.

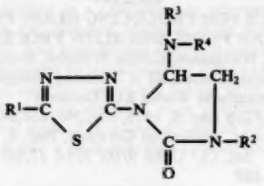
4,052,191

1-THIADIAZOLYL-5-ALKYL- AND ARYLAMINOIMIDAZOLIDINONES

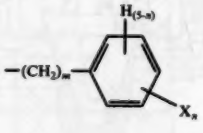
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Mar. 12, 1976, Ser. No. 666,285
Int. Cl.² A01N *9/12;* C07D *285/12*
U.S. Cl. 71—90 10 Claims

1. A Compound of the formula



wherein R^1 is selected from the group consisting of alkyl of up to 18 carbon atoms, cycloalkyl of from 3 to 7 carbon atoms, lower alkenyl, lower chloroalkyl, lower bromoalkyl, trifluoromethyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and propargyl and R^3 and R^4 are each selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, lower haloalkyl, lower hydroxyalkyl, lower alkoxyalkyl, cycloalkyl of from 3 to 7 carbon atoms and



wherein X is selected from the group consisting of lower alkyl, lower alkoxy, halogen, lower haloalkyl, lower alkylthio, nitro and cyano; n is an integer from 0 to 3; and m is the integer 0 or 1, provided that a maximum of one of R^3 and R^4 is an aromatic moiety.

10. A method of controlling weeds which comprises contacting said weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quentity toxic to weeds, a compound of claim **1.**

4,052,192

1-(5-t-BUTYL-1,3,4-THIADIAZOL-2-yl)-3-METHYL-5-NONANOYLOXY-1,3-IMIDAZOLIDIN-2-ONE HERBICIDE

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Mar. 18, 1976, Ser. No. 668,014

The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.

Int. Cl.² A01N 9/12; C07D 285/12

U.S. Cl. 71—90 3 Claims

1. The compound 1-(5-t-butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-nonanoyloxy-1,3-imidaxolidin-2-one.

3. A method of controlling weeds which comprises contacting the weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, the compound of claim 1.

4,052,193

1-(5-t-BUTYL-1,3,4-THIADIAZOL-2-yl)-3-METHYL-5-OCTANOYLOXY-1,3-IMIDAZOLIDIN-2-ONE HERBICIDE

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Mar. 18, 1976, Ser. No. 668,015

The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.

Int. Cl.² A01N 9/12; C07D 285/12

U.S. Cl. 71—90 3 Claims

1. The compound 1-(5-t-butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-octanoyloxy-1,3-imidazolidin-2-one.

3. A method of controlling weeds which comprises contacting the weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, the compound of claim 1.

4,052,194

OXIME ABSCISSION AGENTS

Merrill Wilcox, 2911 NW. 30th Terrace, Gainesville, Fla. 32601

Continuation of Ser. No. 436,297, Jan. 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 275,657, July 27, 1972, abandoned. This application Sept. 16, 1975, Ser. No. 618,880

Int. Cl.² A01N 9/20

U.S. Cl. 71—121 3 Claims

1. A process of aiding in the harvesting of fruit particularly for the promotion of the facilitation of fruit abscission, which process comprises applying to the fruit-bearing plant or to the fruit itself an effective amount of an oxime compound selected from the group consisting of glyoxime, dichloroglyoxime and the alkali metal, alkaline-earth metal, copper and aluminum salts thereof.

4,052,195

METHOD FOR MELTING IRON-CONTAINING MATERIAL

Gunter Meyer; Dietrich Radke, Essen, and Gunter Reimann, Essen-Bredeney, all of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed June 29, 1976, Ser. No. 701,032

Claims priority, application Germany, July 2, 1975, 2529391

Int. Cl.² C21C 5/52; H05B 7/18

U.S. Cl. 75—10 R 8 Claims

1. In a method for melting iron-containing material by introducing such material into an electric furnace containing a mass of molten metal and a mass of molten slag floating on the metal and provided with electrodes connected to an electrical power source establishing a potential difference between the electrodes, the improvement wherein the electrodes are immersed in the molten slag so that a flow of electrical current occurs between the electrodes and is converted into heat by the resistance of the slag, and said method comprises adjusting the concentration of free charge carriers in the slag in order to impart a selected electrical conductivity to the slag of between 500 and 1,500 millimhos/cm, thereby to impart a selected value to the ratio of the amplitude of the current flowing exclusively through the molten slag to the amplitude of the current flowing through the molten metal, and the electrodes are immersed into the molten slag such that the distance between the molten metal and the electrodes is between about 1 and 100 cm.

4,052,196

METHOD AND APPARATUS OF MOISTENING CHARGE MATERIAL FOR AN ORE-DRESSING PLANT

Gerald Namy, 13, Cours Fauriel, Saint Etienne (Lorie), France: August Becker, Stummstrasse 33, and Klaus Trappe, Merzigerstrasse 83, both of Dillingen, Germany

Filed Jan. 27, 1970, Ser. No. 6,193

Int. Cl.² C21B 3/04; B01F 15/02

U.S. Cl. 75—25 10 Claims

1. A method of precluding the disposal of dirty water generated in steel production into rivers and the like by using such dirty water to moisten charge material for an ore-dressing plant consisting of the steps of introducing the dirty water, which is an iron oxide containing dust-water dispersion obtained by spray-precipitation of the waste gases from an oxygen-blowing steel production plant, into a thickener; removing the dispersion from the thickener by at least one pump and conveying the dispersion through conduits directly to a mixing device; introducing charge material for the ore-dressing plant into the mixing device to mix the dispersion and charge material; controlling the amount of dispersion dependent upon the water requirements of the charge material for the ore-dressing plant, by altering the amount of dispersion conveyed in the conduits between the thickener and the mixing device; recycling a portion of the water in the thickener back to the spray precipitation apparatus; and introducing water into the thickener to maintain a desired level, the thickener acting as a reservoir for the solids of the dust-water dispersion.

4,052,197

PROCESS FOR MAKING STEEL FROM PIG IRON

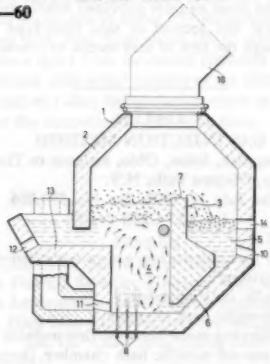
Karl Brotzmann; Helmut Knuppel, both of Sulzbach-Rosenberg; Paul Rheinlander, and Gustav Mahn, both of Wolfenbuttel, all of Germany, assignors to Stahlwerke Peine-Salzgitter AG, Peine, Germany

Filed Feb. 24, 1976, Ser. No. 661,061

Claims priority, application Germany, Feb. 25, 1975, 2507961

Int. Cl.² C21C 5/34

U.S. Cl. 75—60 25 Claims



1. A process for producing steel from unrefined molten pig iron in a refining vessel which is characterized by a regular largely ejection-free refining behavior and also by high yield and by low iron losses, which process comprises:

providing a bath of partially refined pig iron in said vessel

introducing a refining gas into said bath beneath the top surface of said bath by means of tuyeres mounted in the refractory masonry of the refining vessel, each such tuyere blowing a stream of refining gas surrounded by a protective medium into said bath and said gas stream rising upwardly in said bath and agitating said bath; and

concurrently with the introduction of said refining gas beneath the top surface of said bath, feeding unrefined molten pig iron to be converted into steel, into said bath adjacent to the zone into which said refining gas is fed into said vessel whereby said refining gas and protective medium agitate said unrefined molten pig iron and mix the said pig iron into said bath and the kinetic energy of the refining means contributes to increasing the agitation of the bath.

4,052,198

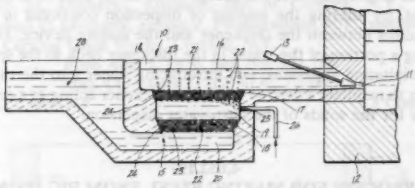
METHOD FOR IN-LINE DEGASSING AND FILTRATION OF MOLTEN METAL

John C. Yarwood, Madison, Conn.; James E. Dore, Ballwin, Mo., and Robert K. Preuss, Middletown, Conn., assignors to Swiss Aluminium Limited, Chippis, Switzerland

Division of Ser. No. 654,724, Feb. 2, 1976, Pat. No. 3,947,363, and a continuation-in-part of Ser. No. 563,213, March 28, 1975, Pat. No. 3,947,363, and a continuation-in-part of Ser. No. 597,963, July 21, 1975, Pat. No. 4,024,056. This application Dec. 6, 1976, Ser. No. 747,571

Int. Cl.² C22B *21/00*

U.S. Cl. 75—68 R **12 Claims**



1. A method for the degassing and filtration of molten metal which comprises passing said molten metal through a chamber wherein said metal travels through at least two sequentially placed, spaced-apart filter-type media and is brought into counter-current contact with a fluxing gas while traveling through the first of said filter-type media, and wherein said fluxing gas issues from an inlet provided within said chamber between the first and second of said filter-type media and percolates through the first of said media to contact said molten metal.

4,052,199

GAS INJECTION METHOD

Mahesh C. Mangalick, Solon, Ohio, assignor to The Carborundum Company, Niagara Falls, N.Y.

Filed July 21, 1975, Ser. No. 597,806

Int. Cl.² C22B *21/00*

U.S. Cl. 75—68 R **14 Claims**

1. A process for introducing gas into molten metal in an apparatus comprising

a. a first metallic bath chamber;

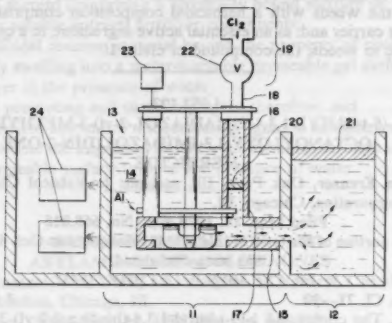
b. a second metallic bath chamber;

c. means for flowing metal from the first metallic bath chamber to the second metallic bath chamber, through a metal transfer conduit, said metal transfer conduit being at least partially submerged in the first metallic bath chamber;

d. a two-ended gas injection conduit having one end submerged within the first metallic bath chamber, the submerged end of the gas injection conduit being connected to the metal transfer conduit, the gas injection conduit being so constructed and arranged that the metal of the first metallic bath chamber is flowable past the submerged end of the gas injection conduit so as to contact the gas within the gas injection conduit and permit passage of the gas from the gas injection conduit to the metal transfer conduit, the gas injection conduit having an unsubmerged end opposite the submerged end of the gas injection conduit; and

e. means for providing gas to be introduced into the molten metal into the unsubmerged end of the gas injection conduit, comprising the steps of:

1. introducing a gas to be injected into the molten metal, into the two-ended gas injection conduit, one end of which is submerged within the first metallic bath chamber and



connected to the metal transfer conduit between the first and second metallic bath chambers; while

2. flowing the molten metal from the first metallic bath chamber through the metal transfer conduit to the second metallic bath chamber, past the submerged end of the gas injection conduit connected so as to connect the gas within the gas injection conduit and permit passage of the gas from the gas injection conduit to the metal transfer conduit; and

3. passing the gas from the gas injection conduit into the metal transfer conduit and into the flowing molten metal in the metal transfer conduit.

4,052,200

PROCESS FOR DEBISMUTHIZING LEAD

Denby Harcourt Ward, and James Dixon Iley, both of Port Pirie, Australia, assignors to The Broken Hill Associated Smelters Proprietary Limited, Melbourne, Australia

Filed Aug. 18, 1976, Ser. No. 715,297

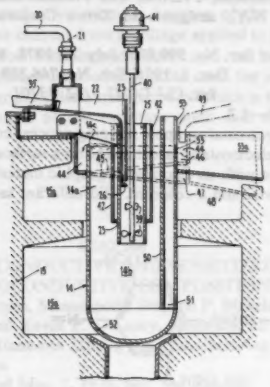
Claims priority, application Australia, Aug. 19, 1975, 2844/75

Int. Cl.² C22B *13/06*

U.S. Cl. 75—78 **20 Claims**

1. A continuous process for debismuthizing lead containing one or more alkaline earth metals or alloys thereof, which comprises continuously adding thereto a reagent selected from the group consisting of antimony, arsenic and alloys containing antimony and/or arsenic, so as to form a crust/bullion mixture, continuously introducing the crust/bullion mixture into the lower separation zone of a separation vessel having an upper liquation zone and a lower separation zone, maintaining the temperature in the upper liquation zone between 330° and 480° C and maintaining the temperature in the lower separation zone between the freezing point of lead and 350° C, the average temperature in the upper liquation zone being at least 15° C higher than the average temperature in the lower separation zone, separating crust particles from the bullion in the lower separation zone, causing the crust particles to move upwardly in the vessel and the bullion to move downwardly in the vessel, separating entrained lead from the crust particles in the upper liquation zone so as to form enriched crusts, removing the

enriched crusts continuously or intermittently from the upper surface of the material in the vessel, and withdrawing debismu-



thized product lead continuously from at or near the lower end of the lower separation zone.

4,052,201

AMORPHOUS ALLOYS WITH IMPROVED RESISTANCE TO EMBRITTLEMENT UPON HEAT TREATMENT

Donald E. Polk, Boston, Mass.; Ranjan Ray, and Lance A. Davis, both of Morristown, N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed June 26, 1975, Ser. No. 590,656
Int. Cl.² C22C *19/00, 38/06, 38/32*
U.S. Cl. 75—124 **5 Claims**

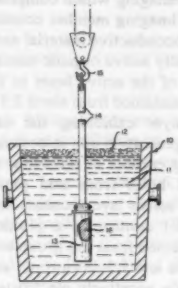
2. An amorphous metal alloy that is at least 50% amorphous, characterized in that the alloy consists essentially of the composition M'_aB_b, where M' is at least three elements selected from the group consisting of iron, nickel, cobalt and chromium, the amount of each of iron, nickel and cobalt ranging from about 20 to 35 atom percent and the amount of chromium ranging from about 5 to 20 atom percent and B is boron and where *a* ranges from about 75 to 85 atom percent and *b* ranges from about 15 to 25 atom percent, said alloy being resistant to embrittlement upon heat treatment in the temperature range of about 200° to 325° C for at least 5 minutes.

4,052,202

ZIRCONIUM ALLOY ADDITIVE AND METHOD FOR MAKING ZIRCONIUM ADDITIONS TO STEELS

Leon Luyckx, New Castle, Pa., assignor to Reactive Metals & Alloys Corporation, West Pittsburg, Pa.

Filed Sept. 25, 1975, Ser. No. 616,647
Int. Cl.² C22C *1/02, 16/00*
U.S. Cl. 75—129 **11 Claims**



1. An additive for making zirconium additions to steel comprising generally uniformly sized pieces of an alloy consisting essentially of about 70% to 90% zirconium and the balance iron with residual impurities.

4,052,203

CRUSHABLE LOW REACTIVITY NICKEL-BASE MAGNESIUM ADDITIVE

Floyd Gotthard Larson, Jr., Ringwood, N.J., and John Joseph deBarbadillo, II, Warwick, N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,367
Int. Cl.² C22C *33/08*
U.S. Cl. 75—130 B **9 Claims**

1. In a continuous treatment process for producing ductile cast iron in which a nickel-magnesium addition agent is added to a molten stream of cast iron passing through a treatment zone, the improvement comprising utilizing as the addition agent an alloy having a composition consisting generally of, by weight, from about 3% to about 6% magnesium, from above 20% to about 40% iron, from about 2% to about 12% silicon, and the balance apart from incidental elements and impurities, essentially nickel, said nickel content of the alloy being at least about 50% and said alloy being characterized in that it is crushable without the formation of excessive fines.

4,052,204

QUATERNARY SPINODAL COPPER ALLOYS

John Travis Plewes, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 11, 1976, Ser. No. 685,263
Int. Cl.² C22C *9/02*; C21D *1/00*
U.S. Cl. 75—154 **5 Claims**

1. Cold worked and aged spinodal copper alloys consisting essentially of nickel in an amount of from 2–20%, tin in an amount of from 2–8%, an additional element selected from the group consisting of Fe in an amount of from 2 to 15%, Zn in an amount of from 2 to 10%, and Mn in an amount of from 2 to 15%, and remainder copper.

4,052,205

PHOTOCONDUCTIVE IMAGING MEMBER WITH SUBSTITUTED ANTHRACENE PLASTICIZER

Milan Stolka, Fairport, and John F. Yanus, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 24, 1975, Ser. No. 616,464
Int. Cl.² G03G 5/04, 5/06, 5/08
U.S. Cl. 96—1 PC **14 Claims**

9. A method of imaging which comprises:

a. providing an imaging member consisting essentially of a layer of photoconductive material and a contiguous layer of an electrically active organic material with the ratio of the thickness of the active layer to the photoconductive layer being maintained from about 2:1 to 200:1, said photoconductive layer exhibiting the capability of photoexcited hole generation and injection, said active organic material being capable of receiving and transporting the photo-excited holes from said photoconductive layer, wherein said active layer consists essentially of poly(N-vinylcarbazole) containing a plasticizing amount of a plasticizer selected from the group consisting of 1-isopropyl anthracene and 1,5-diisopropyl anthracene;

b. then uniformly negatively electrostatically charging the free surface of the active layer; and

c. exposing said charged layer to a source of activating radiation to which the photoconductive layer is absorbing and to which the active layer is substantially transparent and non-absorbing, the exposure being in the form of a pattern of light and shadow optically projected toward said layer, whereby photo-excited holes generated by said photoconductive layer are injected into and transported through said active layer to form a latent electrostatic image on the free surface of the active layer.

4,052,206

ELECTROPHOTOGRAPHY

Masayasu Anzai, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Nov. 3, 1975, Ser. No. 628,492
Claims priority, application Japan, Nov. 7, 1974, 49-128418
Int. Cl.² G03Q 13/22
U.S. Cl. 96—1 R **10 Claims**

1. An electrophotographic process for forming a latent charge image on the surface of a transparent electrical organic insulator layer in a recording medium having a photoconductor layer sandwiched between a conductive support and said organic insulator layer, comprising the steps of

a. uniformly applying a D.C. corona charge of one polarity to said surface of said organic insulator layer of said recording medium in the dark;

b. exposing areas of said uniformly D.C. corona charged surface of said organic insulator layer to light reflected from an original image while applying simultaneously a D.C. corona charge of the same polarity as that used in said uniform charging of said surface of said organic insulator layer of step (a);

c. applying a charge of polarity opposite to that used in said steps (a) and (b) to the surface of said organic insulator layer in the dark until an electric potential on the unexposed surface of said organic insulator layer has a charge of polarity opposite to that of steps (a) and (b); and then

d. uniformly exposing said charged surface of said organic insulator layer of step (c) to light.

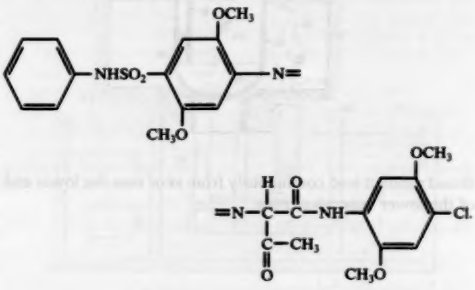
4,052,207

ELECTROSTATOGRAPHIC IMAGING PROCESS

Joseph Mammino, Penfield, and Franklin Jossel, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 599,800, July 28, 1975. This application Dec. 1, 1976, Ser. No. 746,359
Int. Cl.² G03G 5/12, 13/01
U.S. Cl. 96—1.2 **19 Claims**

1. An electrostatographic imaging process comprising establishing an electrostatic latent image on a surface and contacting said surface with an electrostatographic material comprising a resin material and a colorant, said colorant satisfying the formula.

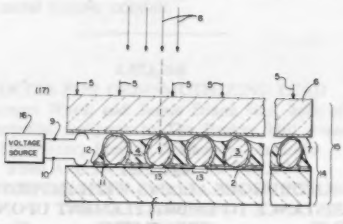


4,052,208

IMAGE RECORDING MEDIUM EMPLOYING PHOTOCONDUCTIVE GRANULES AND A HEAT DISINTEGRABLE LAYER

Michael A. Martinelli, 58 Wedgemere Ave., Winchester, Mass. 01890

Continuation-in-part of Ser. No. 357,107, May 4, 1973, abandoned. This application June 5, 1975, Ser. No. 584,108
Int. Cl.² G03G 5/00, 5/12, 17/00
U.S. Cl. 96—1.5 R **32 Claims**



1. A positive transparent radiation image recording medium for use in conjunction with a voltage source comprising:

a radiation transparent electrically conductive layer,

a thin opaque electrically conductive metallic layer of heat disintegrable material,

said layers being adapted for connection to said voltage source,

a mono-granular layer of photoconductive material comprising photoconductive granules of substantially the same size contained in a quenching binder,

said binder also permanently fixing the physical positions of the granules,

said layer of photoconductive material is between the electrically conductive layers which make electrical contact to the granules through the portion of the quenching binder between the granules and the conductive layers,

said opaque layer is sufficiently thin so that localized holes

are produced in it corresponding in location with the radiation image applied through the transparent layer to the photoconductive material because of the heat produced by the current from a voltage applied to the layers, in combination with the radiation,

whereby the distribution of said holes over the area of the opaque layer provides a transparency which is a replica of the distribution of the radiation upon said transparent layer.

4,052,209

SEMICONDUCTIVE AND SENSITIZED PHOTOCONDUCTIVE COMPOSITIONS

William A. Huffman, Minneapolis; Stephen P. Birkeland, White Bear Lake, and Kevin P. O'Leary, Roseville, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 7, 1975, Ser. No. 556,400
Int. Cl.² G03G 5/04, 5/09
U.S. Cl. 96—1.5 R **19 Claims**

1. A photoconductive composition comprising an organic, photoconductive, polymeric binder layer and a dye comprising at least two quinoid benzene rings linked through a bridging moiety selected from the group consisting of cyclopropane, cyclobutane and $-(C=C)-_n$ wherein n is 1 or 2, and wherein any ring carbons of the cyclopropane and cyclobutane bridging moieties not directly bonded to quinoid benzene rings are bonded to oxygen atoms to complete a carbonyl group, wherein said dye is present in a ratio of at least 0.5×10^{-6} moles of dye per mole of said organic, photoconductive, polymeric binder.

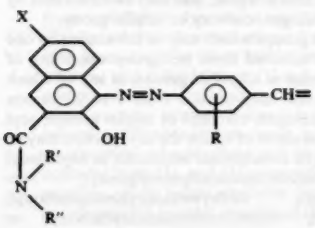
4,052,210

ELECTROPHOTOGRAPHIC COPYING PROCESS AND REPRODUCTION ELEMENT

Adrianus M. P. Hectors, Tegelen, Netherlands, assignor to Oce-van der Grinten N.V., Venlo, Netherlands

Filed June 30, 1976, Ser. No. 701,206
Claims priority, application Netherlands, July 4, 1975, 7507972
Int. Cl.² G03G 5/04, 5/09; G03C 1/10
U.S. Cl. 96—1.5 R **24 Claims**

11. Electrophotographic reproduction element comprising a conductive support having thereon a photoconductive layer containing a bisazo naphthol compound, characterized in that said layer contains in dispersion in a binder a bisazo naphthol compound having the general formula



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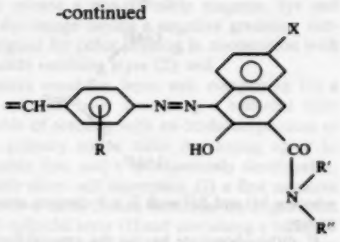


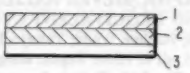
wherein R represents hydrogen or one or more OCH_3 or OC_2H_5 groups or one or more chlorine or bromine atoms; X is hydrogen, chlorine or bromine; R′ is hydrogen or a substituted or non-substituted aryl, heterocyclic aryl, aralkyl or lower alkyl group, and R″ is hydrogen or a substituted or non-substituted lower alkyl or cyloalkyl group, or R′ and R″ together with the nitrogen atom to which they attach constitute a saturated or non-saturated 5- or 6- membered ring.

4,052,211

IMAGE FORMING MATERIAL

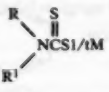
Eiichi Inoue; Hiroshi Kokado, both of Tokyo; Takashi Yamaguchi, Yokohama; Yukio Tokunaga, Musashino; Takao Nakayama, Yokohama, and Toshihiro Yamase, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 420,347, Nov. 29, 1973, abandoned. This application Dec. 24, 1975, Ser. No. 644,010
Claims priority, application Japan, Nov. 30, 1972, 47-120466
Int. Cl.² G03C 5/00, 1/84, 1/02
U.S. Cl. 96—35 **16 Claims**



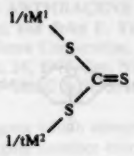
1. A process for forming an image on a multilayer image-forming material which consists of imagewise irradiating with electromagnetic radiation a multilayer image-forming material which comprises a layer of an organic sulfur compound and a layer of a metal capable of forming an interreaction product with said sulfur compound upon said irradiation with electromagnetic radiation, said sulfur compound being selected from the group consisting of:

A. dithiocarbamate having the general formula:



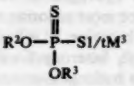
wherein R and R^1 each is a hydrogen atom, an alkyl group, or an aryl group, and R and R^1 may combine to form a 5- or 6-membered ring, and M is a hydrogen atom, a meta ion or group;

B. trithiocarbonate having the general formula:



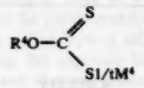
wherein M^1 and M^2 each is a hydrogen atom, a metal ion or group;

C. dithiophosphate having the general formula:



wherein R^2 and R^3 each is a hydrogen atom, an alkyl group or an aryl group, wherein M^3 is a hydrogen atom, a metal ion or group;

D. dithioxanthate having the general formula:



wherein R^4 is an alkyl group and M^4 is a hydrogen atom, a metal ion or group; and

E. bismuthiol-II;

said metal capable of forming said interreaction product being selected from the group consisting of copper, silver, tin, nickel, cadmium, magnesium, tellurium, gallium, aluminum and gold; in the above formulas (*t*) represents the valency of the metal ion or group.

4,052,212

PHOTOGRAPHIC SILVER HALIDE EMULSION CONTAINING 2-EQUIVALENT CYAN COUPLER

Hidetaka Deguchi; Hajime Wada; Takaya Endo; Shoji Kikuchi, and Haruo Hori, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Feb. 5, 1975, Ser. No. 547,405

Claims priority, application Japan, Feb. 8, 1974, 49-16057

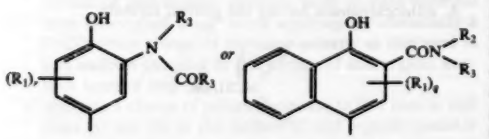
Int. Cl.² G03C *7/00*

U.S. Cl. 96—56.2 **5 Claims**

1. A process for forming a cyan dye image, which comprises bringing a 2-equivalent type cyan coupler into contact with exposed silver halide crystals in the presence of a phenylenediamine type developing agent for said silver halide crystals, said 2-equivalent cyan coupler having the general formula:

$$A\ (OCH_2CO - Y)_n \text{ or } (A' - OCH_2CO)_m - Y'$$

wherein A and A' each represent, at the active point of the cyan coupler, a cyan coupler residue, which has the general formula:



wherein R_1 represents a hydrogen atom, a halogen atom, a saturated or unsaturated, aliphatic or cycloaliphatic hydrocarbon group, —O—R_4 or —S-R_4 (where R_4 represents a said hydrocarbon group), r is 1 to 3 and q is 1 to 5 and if r or q is more than 1 the R_1 groups may be the same or different; and each of R_2 and R_3 independently represents a saturated or unsaturated, aliphatic or cycloaliphatic hydrocarbon group, an aryl group, a heterocyclic group or hydrogen atom or R_2 and R_3 together with the nitrogen atom to which they are attached form a heterocyclic group; Y represents a heterocyclic group, an alkoxy group, a phenoxy group, a naphthoxy group, an aliphatic hydrocarbon amino group, a heterocyclic amino group and a mercapto group, which groups also include those having substituents which are selected from halogen, nitro, hydroxyl, carboxyl, amino, sulfo, alkyl, alkenyl, aryl, heterocyclic, alkoxy, aryloxy, arylthio, arylazo, acylamino, carbamoyl, ester, acyl, acyloxy, sulfonamide, sulfamoyl, sulfonyl, morpholino, piperazyl and imidazolyl groups; Y' is an m-valent group selected from the group consisting of a heterocyclic group, an alkylenedioxy group, an arylenedioxy group, an alkylenediamino group, an arylenediamino group and a heterocyclic diamino group; wherein said Y' groups also include those having substituents which are selected from halogen, nitro, hydroxyl, carboxyl, amino, sulfo, alkyl, alkenyl, aryl, heterocyclic, alkoxy, aryloxy, arylthio, arylazo, acylamino, carbamoyl, ester, acyl, acyloxy, sulfonamide, sulfamoyl, sulfonyl, morpholino, piperazyl and imidazolyl groups; and n is 1 or 2 and m is 2.

4,052,213

LIGHT-SENSITIVE PHOTOGRAPHIC MATERIAL

Hans Heinrich Credner, Hohenschaeftlarn; Wolfgang Lässig; Ernst Meier, both of Munich; Erwin Ranz, Leverkusen; Siegfried Schleger, Munich, and Karl-Wilhelm Schranz, Odenthal-Hahnenberg, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 7, 1976, Ser. No. 721,086

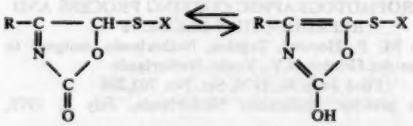
Claims priority, application Germany, Sept. 13, 1975, 2540959

Int. Cl.² G03C *5/30, 1/06*

U.S. Cl. 96—66.3 **7 Claims**

1. Light-sensitive photographic material having at least one silver halide emulsion layer containing a thioether compound which on reaction with the oxidation product of a color developer substance containing primary aromatic amino groups releases a diffusible mercaptan which inhibits development of the silver halide, wherein the improvement comprises the thioether compound is an oxazolinone-2 compound of the following formula or its tautomeric form:

(I)



in which

X represents an alkyl group with 1 to 10 carbon atoms, which may be substituted by carboxyl and/or amino groups, a phenyl group or a 5- or 6-membered heteroaromatic group having at least one nitrogen atom,

R represents

an alkyl group having from 1 to 18 carbon atoms which may be straight or branched chain or cyclic, and may be substituted by alkoxy, aroxy, aryl, halogen, carboxy or sulpho group,

or phenyl or naphthyl groups which may be substituted by one or more substituents selected from the group consisting of alkyl, alkoxy, alkylamino or alkylthio groups, in any of which groups the alkyl portion may contain from 1 to 20 carbon atoms; nitro groups; halogen; carboxyl or sulpho groups; acyl or acylamino groups in either of which the acyl portion may be derived from carboxylic or sulphonic acids such as heptadecyl carbonamido; dimethylaminosulphonylphenyl; octadecylaminosulphonyl; methyloctadecylaminocarbonyl; phenylaminocarbonyl; benzoylaminophenoxycarbonyl or ethoxycarbonyl;

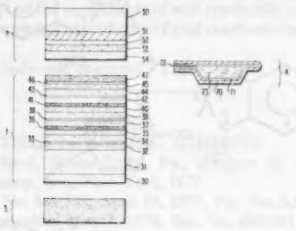
or a 5- or 6-membered heterocyclic group having at least one nitrogen atom
whereby a mercapto group is splittable from the 5-position of the oxazolinone-2 compound.

4,052,214

COLOR DIFFUSION TRANSFER PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL FOR FORMING BOTH POSITIVE TRANSFER DYE IMAGES AND NEGATIVE DYE IMAGES

Yasushi Oishi, and Yoshinobu Yoshida, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 26, 1975, Ser. No. 607,967
Claims priority, application Japan, Aug. 26, 1974, 49-97640
Int. Cl.[2] G03C *1/76, 1/40, 7/00, 5/24*
U.S. Cl. 96—74 **70 Claims**



1. A color photographic light-sensitive material which comprises a transparent support having thereon at least three silver halide emulsion layer units, each of which is sensitive to a different wavelength region of light and capable of simultaneously providing, as a result of exposure and development, both a diffusable dye with a positive image distribution and non-diffusible dye with a negative image distribution, these units including

I. a blue sensitive emulsion layer unit comprising (1) a hydrophilic collodial layer containing a ballasted yellow coupler capable of reacting with an oxidation product of an aromatic primary amine color developing agent to form a diffusible yellow dye, and a spontaneously developable, slightly soluble silver salt dispersion, (2) a first negative type blue-sensitive silver halide emulsion layer provided adjacent said colloidal layer (1) and containing a ballasted compound capable of reacting with an oxidation product of an aromatic primary amine color developing agent to release a diffusible development inhibitor inhibiting the development of said silver salt in the above described colloidal layer (1), and (3) a second negative type blue-sensitive silver halide emulsion layer containing a ballasted yellow coupler capable of reacting with an oxidation product of an aromatic primary amine color developing agent to release a nondiffusible yellow dye image having a negative gradation suitable as an original for color printing in cooperation with said silver halide emulsion layer (2);

II. a green-sensitive emulsion layer unit comprising (1) a hydrophilic colloidal layer containing a ballasted magenta coupler capable of reacting with an oxidation product of an aromatic primary amine color developing agent to form a diffusible dye, and a spontaneously developable, slightly soluble silver salt dispersion, (2) a first negative type green-sensitive silver halide emulsion layer provided adjacent said colloidal layer (1) and containing a ballasted compound capable of reacting with an oxidation product of an aromatic primary amine color developing agent to release a diffusible development inhibitor inhibiting the development of said silver salt in the above described colloidal layer (1), and (3) a second negative type green-sensitive silver halide emulsion layer containing a ballasted magenta coupler capable of reacting with an oxidation product of an aromatic primary amine color developing agent to release a non-diffusible magenta dye and providing a dye image having a negative gradation suitable as an original for color printing in cooperation with said silver halide emulsion layer (2); and

III. a red-sensitive emulsion layer unit comprising (1) a hydrophilic colloidal layer containing a ballasted cyan coupler capable of reacting with an oxidation product of an aromatic primary amine color developing agent to form a diffusible dye, and a spontaneously developable, slightly soluble silver salt dispersion, (2) a first negative type red-sensitive silver halide emulsion layer provided adjacent said colloidal layer (1) and containing a ballasted compound capable of reacting with an oxidation product of an aromatic primary amine color developing agent to release a diffusible development inhibitor inhibiting the development of said silver salt in the above described colloidal layer (1), and (3) a second negative type red-sensitive silver halide emulsion layer containing a ballasted cyan coupler capable of reacting with an oxidation product of an aromatic primary amine color developing agent to release a non-diffusible cyan dye and providing a cyan image having a negative gradation suitable as an original for color printing in cooperation with said silver halide emulsion layer (2).

4,052,215

COLOR PHOTOGRAPHIC MULTILAYERED MATERIAL WITH IMPROVED COLOR DENSITY

Franz Moll, Leverkusen, and Lothar Rosenhahn, Cologne, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Nov. 8, 1976, Ser. No. 739,581
Claims priority, application Germany, Nov. 11, 1975, 2550552
Int. Cl.[2] G03C *1/84, 1/06, 1/48*
U.S. Cl. 96—84 R **3 Claims**

1. In a color photographic material comprising at least one lightsensitive silver halide emulsion layer and at least one light-insensitive layer of binder containing a colloidal silver dispersion the improvement according to which the light-insensitive layer of binder containing the colloidal silver dispersion or a light-insensitive layer of binder adjacent thereto contains an alkali metal iodide or ammonium iodide.

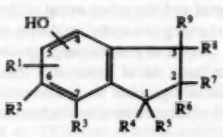
4,052,216

COLOR PHOTOGRAPHIC MATERIAL CONTAINING A HYDROXYINDANE

Johannes Sobel, Leverkusen; Alfons Klein, Dusseldorf; Fritz Nittel, Leverkusen, and Karlfried Wedemeyer, Cologne, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

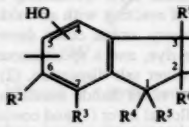
Filed June 8, 1976, Ser. No. 693,942
Claims priority, application Germany, June 13, 1975, 2526468
Int. Cl.[2] G03C *1/84, 1/40, 1/02*
U.S. Cl. 96—84 UV **3 Claims**

1. A light sensitive color photographic material capable of providing dye images upon exposure and development in a conventional liquid color developer and having improved resistance to bleaching of the dye image containing a silver halide emulsion and at least one hydrophilic binder layer containing a color coupler for the production of a dye image and in said binder layer in an amount to effectively reduce the bleaching of the produced dye image a hydroxy indane of the following formula:



in which

R^1 = hydrogen, alkyl, cycloalkyl, aralkyl or a further hydroxy indane radical bonded by —S—, —SO_2—, —O—, or a straight or branched chain alkylene bridge, of the formula:



R^2 and R^3=hydrogen, halogen, —NO_2, carboxyl, alkyl, cycloalkyl, aralkyl, aryl, where the stated alkyl, cycloalkyl, aralkyl and aryl groups can contain further substituents; R_2 and R_3 together can represent the radical necessary for completing a condensed carbocyclic ring;

R^2 and R^3=hydrogen, alkyl, cycloalkyl, aryl, or R^4 and R^5 together can represent the radical necessary for completing a 5- or 6-membered cycloaliphatic ring;

R^6 and R^7= hydrogen, alkyl, cycloalkyl, aralkyl or phenyl; R^6 and R^7 together can represent the radical necessary for completing a 5- or 6-membered cycloaliphatic ring;

R^8 and R^9 = as R^6 and R^7; when R^8 and R^9 together represent the radical necessary for completing a 5- or 6-membered carbocyclic ring which may contain an annulated ring, this radical when annulated can contain a hydroxyl substituted benzo ring, capable of forming a dihydroxyspiro-bis-indane.

4,052,217

BIMETALLIC LITHOGRAPHIC PRINTING PLATES

Leonard James Watkinson, Leeds, England, assignor to Howson-Algraphy Limited, London, England

Continuation of Ser. No. 519,050, Oct. 29, 1974, abandoned, which is a division of Ser. No. 304,978, Nov. 9, 1972, Pat. No. 3,865,595. This application May 11, 1976, Ser. No. 685,146

Claims priority, application United Kingdom, Nov. 9, 1971, 52084/71; May 12, 1972, 22493/72

Int. Cl.² G03C 1/94; G03F 7/02

U.S. Cl. 96—86 R **11 Claims**

1. A sheet material suitable for the production of a bimetallic lithographic printing plate, which sheet material comprises

a. a self-supporting film or sheet of inert electrically insulating plastics material,

b. a base metal layer laminated to one surface of the film or sheet, and

c. a bimetallic layer laminated to the other surface of the film or sheet, one metal of the bimetallic layer being an ink-receptive metal and the other metal of the bimetallic layer being a water-receptive metal, said film or sheet forming a continuous electrically insulating spacing barrier layer between the base metal layer and the bimetallic layer whereby said lithographic sheet material is characterized by improved resistance to electrochemical corrosion during storage.

4,052,218

NOVEL SPIRO-HETEROCYCLIC COMPOUNDS, THEIR PREPARATION, AND USE THEREOF IN A THERMOGRAPHIC RECORDING MATERIAL

André Samat; Robert Guglielmetti, both of Brest, and Jacques Metzger, Marseille, all of France, assignors to Laboratoires de Physicochimie Appliquee I S S E C, Ferney Voltaire, France

Filed May 19, 1975, Ser. No. 579,119

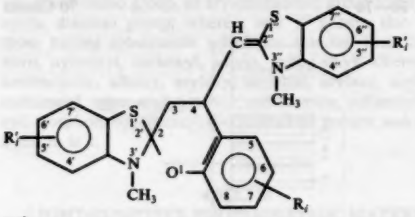
Claims priority, application France, May 24, 1974, 74.18078

Int. Cl.² G03C 1/02

U.S. Cl. 96—114.1 **7 Claims**

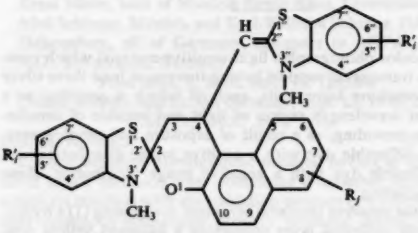
1. Thermochromic spiro heterocyclic compounds, selected from the group consisting of the following formulae;

(1)



and

(2)



where R_i is a substituent in positions 5, 6, 7 and 8 in formula (1); R_i' is a substituent in positions 4', 5', 6' and 7' and 4'', 5'', 6'' and 7'' in formulae (1) and (2); and R_j is a substituent in positions 5, 6, 7, 8, 9 and 10 in formula (2); wherein R_i and R_j are selected from the group consisting of hydrogen, alkyl, OH, OR, NH_2, NR_1R_2 and NHCOR, where R, R_1 and R_2 each denotes an alkyl radical; and wherein R_i' is selected from the group consisting of hydrogen, alkyl, OH, OR, NH_2, NR_1R_2, NHCOR, NO_2, C=N, HSO_3, CHO, COR, COOH, COOR, and halogen, where R, R_1 and R_2 each denotes an alkyl radical.

4,052,219

PIPE COATING COMPOSITION

Oren L. Marrs; Robert E. Reusser, and Dale O. Tieszen, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 28, 1976, Ser. No. 680,836

Int. Cl.² C09D 5/08

U.S. Cl. 106—14 **5 Claims**

1. A composition of matter consisting essentially of a mixture of

about 50 to 70 wt. % of a mineral aggregate,

about 5 to 20 wt. % of asphalt,

about 15 to 35 wt. % of a finely divided mineral filler, and

about 0.05 to 0.5 wt. % of a synthetic organic fiber selected from the group consisting of polyester fibers, polyamide fibers, polyfluorocarbon fibers and poly(arylene sulfide) fibers.

4,052,220

METHOD OF MAKING AN IMPROVED CONCRETE

Raymond C. Turpin, Jr., Atlanta, Ga., assignor to The Partners Limited, Atlanta, Ga., a part interest

Filed Sept. 10, 1975, Ser. No. 612,138
Int. Cl.[2] C04B 7/35
U.S. Cl. 106—90 20 Claims

1. A process for the preparation of ready-mix concrete comprising the following ingredients, water, cement, fine aggregate, a pozzolan material, and a chemical admix selected from the group consisting of derivatives of lignosulfonic acid and its salts and polymer derivatives of sugar, comprising:

preparing a pozzolan-admix slurry comprising a substantial portion of said chemical admix, pozzolan material, and water;

mixing said pozzolan-admix slurry for a period of time between five seconds and one minute;

adding said pozzolan-admix slurry to a mixture comprising one or more of the ingredients of said ready-mix concrete;

adding the remaining ingredients of said ready-mix concrete; and

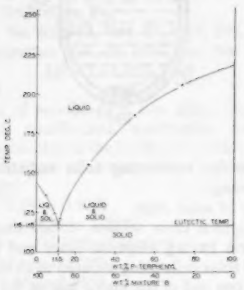
mixing said ready-mix concrete.

4,052,221

ARTICLE MOUNTING ADHESIVE

Edwin J. Pritchard, Coopersburg, Pa., assignor to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 569,529, April 18, 1975, Pat. No. 3,970,494.
This application May 4, 1976, Ser. No. 683,151
Int. Cl.[2] C08L 91/06
U.S. Cl. 106—270 7 Claims



1. An evaporable thermoplastic adhesive for mounting articles which comprises:

a. at least one isomer of chlorinated naphthalene; and

b. p-terphenyl.

4,052,222

TREATMENT OF PIGMENT

Peter Barry Howard, Cleveland, England, assignor to Tioxide Group Limited, Cleveland, England

Filed June 4, 1976, Ser. No. 692,904
Int. Cl.[2] C09C 1/36
U.S. Cl. 106—300 17 Claims

1. A process for the treatment of titanium dioxide pigment comprising

a. forming an aqueous dispersion of pigmentary titanium dioxide containing a first water-soluble compound of silicon in an amount of from 1 to 2% by weight expressed as SiO_2,

b. adding to the dispersion

a first acidic water-soluble compound of aluminum in an amount of from 1.5 to 2.5% by weight expressed as Al_2O_3,

an acidic water-soluble compound of zirconium in an amount of from 0.5 to 1.5% by weight expressed as ZrO_2, and

an acidic water-soluble compound of titanium in an amount of from 1.0 to 2.0% by weight expressed as TiO_2,

c. changing the pH of the dispersion to a value in the range 7.5 to 8.5, and then

d. adding to the dispersion a second water-soluble compound of silicon in an amount of from 1 to 2% by weight expressed as SiO_2, then

a second acidic water-soluble compound of aluminum in an amount of from 1 to 2% by weight expressed as Al_2O_3, and then

an alkaline water-soluble compound of aluminum in an amount of from 0 to 1.5% by weight expressed as Al_2O_3, all the percentages by weight being based on the weight of TiO_2 in the pigment and recovering the so treated pigment.

4,052,223

TREATMENT OF PIGMENT

Peter Barry Howard, Yarm, England, assignor to Tioxide Group Limited, Billingham, England

Filed Aug. 3, 1976, Ser. No. 711,151
Claims priority, application United Kingdom, Aug. 14, 1975, 33826/75
Int. Cl.[2] C09C 1/36
U.S. Cl. 106—300 13 Claims

1. A process for the treatment of titanium dioxide pigment which comprises forming an aqueous dispersion of titanium dioxide containing as a dispersant 0.1% to 0.3% by weight of monoisopropanolamine, a water-soluble phosphate in an amount of 0.05% to 0.5% by weight expressed as P_2O_5 or a mixture thereof, or a water-soluble silicate in an amount of 0.1% to 0.5% by weight expressed as SiO_2 used alone or together with monoisopropanolamine and/or the phosphate, adding to the aqueous dispersion a water-soluble phosphate in an amount of 0.05% to 1.0% by weight expressed as P_2O_5 when the dispersing agent is not solely a phosphate, a water-soluble hydrolysable acidic compound of zirconium in an amount of from 0.2% to 2.5% by weight expressed as ZrO_2, a water-soluble hydrolysable acidic compound of aluminium in an amount of from 0.2% to 2.5% by weight expressed as Al_2O_3, a water-soluble compound of silicon in an amount of from 0% to 1% by weight expressed as SiO_2, and a water-soluble hydrolysable alkaline compound of aluminium in an amount of 0.5% to 2.5% by weight expressed as Al_2O_3, and adjusting the pH of the dispersion, if necessary, to a value of pH 6.5 to 8.5 prior to recovering the treated pigment from the dispersion will all the percentages by weight being based on the weight of titanium dioxide in the aqueous dispersion.

4,052,224

TREATMENT OF PIGMENT

Peter Barry Howard, Yarm, England, assignor to Tioxide Group Limited, Billingham, England

Filed June 4, 1976, Ser. No. 692,905
Claims priority, application United Kingdom, July 17, 1975, 30049/75
Int. Cl.[2] C09C 1/36
U.S. Cl. 106—300 20 Claims

1. A process for the treatment of titanium dioxide pigment which comprises forming an aqueous dispersion of pigmentary titanium dioxide containing a water-soluble compound of phosphorus in an amount of from 0.2 to 1.0% by weight expressed as P_2O_5, adding to the dispersion so formed an acidic water-soluble compound of aluminium in an amount of from 2.5 to 3.5% by weight expressed as Al_2O_3, a water-soluble acidic compound of zirconium in an amount of from 0.5 to 1.5% by weight expressed as ZrO_2, an acidic water-soluble compound of titanium in an amount of from 1.5 to 3% by weight expressed as TiO_2 and a water-soluble compound of

silicon in an amount of from 0.2 to 2.0% by weight expressed as SiO_2, adjusting the pH of the dispersion to a value of from 3.5 to 4.5 and then adding to the dispersion a water-soluble compound of phosphorus in an amount of from 0.2 to 1.0% by weight expressed as P_2O_5 and an alkaline reacting water-soluble compound of aluminium in an amount of from 0.5 to 1.5% by weight expressed as Al_2O_3, with all the percentages by weight being based on the weight of TiO_2 in the pigment, and adding to the dispersion a mineral acid to adjust the pH to a value of 6.5 to 8 and recovering the treated pigment.

4,052,225

PRODUCTION OF LOW-SULFUR CHROMIUM (III) OXIDE PIGMENT

Manfred Mansmann, Krefeld, and Karl Brandle, Schildgen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 559,454, March 18, 1975, abandoned. This application Aug. 27, 1976, Ser. No. 718,296

Claims priority, application Germany, Apr. 3, 1974, 2416203

Int. Cl.[2] C09C *1/34*; C01G *37/02*

U.S. Cl. 106—302 **11 Claims**

1. In the continuous production of low-sulfur chromium-(III)oxide pigment comprising the steps of reducing a finely divided alkali metal chromate in a heated hydrogen-containing reaction zone at a temperature of about 900° to 1600° C, and precipiatating the resulting chromium(III)oxide in the form of an aqueous dispersion, the improvement which comprises introducing into said reaction zone a solid alkali metal chromate containing about 0.1 to 2% by weight of finely divided silicon dioxide, passing the reduction products from the reaction zone along with the silicon dioxide to a dwell zone, and generating heat within said dwell zone to maintain the temperature therein in the range of about 900° to 1600° C.

4,052,226

DIRECTED ENZYMOLYSIS OF STARCH

Frank Verbanac, Decatur, Ill., assignor to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Sept. 25, 1975, Ser. No. 616,785

Int. Cl.[2] C12D *13/02*; C13F *3/00*; C13L *3/00*

U.S. Cl. 127—29 **14 Claims**

1. A method for controlling the saccharide distribution for starch hydrolyzate obtained by the hydrolysis of starch ester with amylase, comprising:

a. hydrolyzing a starch ester having a degree of ester substitution from about 0.05 to about 0.5 with an amylase to a starch ester hydrolyzate,

b. saponifying the starch ester groups of the starch ester hydrolyzate to the hydroxyl form and thereby provide a saccharide product essentially free from ester groups, and

c. recovering the saponfied saccharide product therefrom.

4,052,227

PARTS WASHER

William A. Delo, Wyoming, and Raymond J. Nielsen, Saranac, both of Mich., assignors to 4 - Share, Inc., Grand Rapids, Mich.

Filed Sept. 22, 1975, Ser. No. 615,224

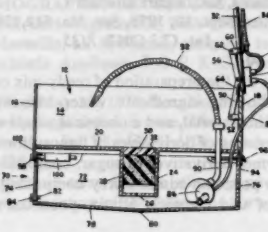
Int. Cl.[2] B08B *3/02*

U.S. Cl. 134—56 R **14 Claims**

1. In a parts washer having a tub, a drain in the tub and a cover hinged to the tub so as to seal the tub when the cover is down, and means for retraining the cover in an open position and for releasing the cover to the sealing position, the improvement in the retaining means comprising:

an overcenter toggle linkage having one end mounted within the tub and another end mounted on the cover, said overcenter linkage having one toggle position bracing the cover in a raised position but slightly tilted forward over the tub and another toggle position permitting closing of the cover over the tub;

said overcenter linkage having at least one fusible link which melts at a relatively low temperature such as that caused



by a fire within the tub so that the cover will quickly seal the tub in the event of fire in the tub.

4,052,228

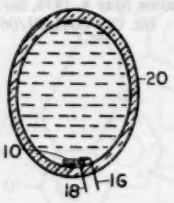
OPTICAL CONCENTRATOR AND COOLING SYSTEM FOR PHOTOVOLTAIC CELLS

Charles R. Russell, 3071 Marilyn Way, Santa Barbara, Calif. 93105

Filed July 12, 1976, Ser. No. 704,328

Int. Cl.[2] H01L *31/04*

U.S. Cl. 136—89 PC **5 Claims**



1. Apparatus for converting solar radiation to electrical energy comprising:

1. a plurality of solar cells;

2. a tube eliptical cross section, comprising a transparent wall section having elliptical inner and outer wall surfaces, said solar cells being secured to an inner wall of said tube near one end of the major axis of the elliptical transparent wall section;

3. a liquid surrounding said cells and substantially filling said tube whereby radiation impinging on said transparent wall section is concentrated on said cells through the curved surface of said liquid.

4,052,229

PROCESS FOR PREPARING A SUBSTRATE FOR MOS DEVICES OF DIFFERENT THRESHOLDS

Richard D. Pashley, Mountain View, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed June 25, 1976, Ser. No. 700,043

Int. Cl.[2] H01L *21/265*, *29/78*

U.S. Cl. 148—1.5 **13 Claims**

1. In the fabrication of MOS devices, a process for preparing a silicon substrate comprising the steps of:

a. forming a first masking means over a first area of said substrate;

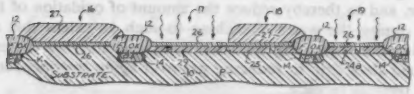
b. subjecting said substrate to a first dopant such that portions thereof other than said first area of said substrate are doped with said first dopant;

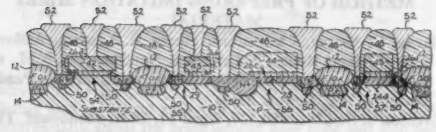
c. forming a second masking means over a second area of said substrate, said second area being coextensive with a portion of said first area;

d. subjecting said substrate to a second dopant such that

portions thereof other than said second area of said substrate are doped with said second dopant;

said steps (a) through (d) resulting in four host regions in said substrate each having a different doping level such





that when a field-effect transistor is formed in each of said host regions each such transistor may have a different threshold voltage;

fabricating MOS devices in said host regions, each having a different threshold voltage.

4,052,230

DEEP HARDENING MACHINABLE ALUMINUM KILLED HIGH SULFUR TOOL STEEL

Paul T. Aylward, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Division of Ser. No. 633,343, Nov. 19, 1975, Pat. No. 4,019,930. This application Nov. 15, 1976, Ser. No. 742,396

Int. Cl.² C21D *9/48*

U.S. Cl. 148—2 **3 Claims**

1. A method of producing a low alloy, aluminum killed, water-quenched, resulfurized, martensitic deep hardening steel, highly machinable in the hardened condition comprising:

a. providing an ingot of a composition consisting essentially of by weight:

Carbon — 0.33 to 0.42%
Manganese — 0.70 to 1.25%
Phosphorus — 0.025% maximum
Sulfur — 0.03 to 0.110%
Silicon — 0.15 to 0.45%
Aluminum — 0.019 to 0.077%
Chromium — 0.90 to 1.85%
Molybdenum — 0.10 to 0.50%

boron and titanium in amounts to effect hardening of said steel, said boron and titanium being present in amounts of at least 0.0005 and 0.010 weight percent, respectively and the balance iron with residual impurities;

b. hot working said ingot to form a hot worked product;

c. water-quenching said hot worked product from an austenitizing temperature; and

d. tempering said water-quenched hot worked product to a desired hardness.

4,052,231

STABLE COLLOID SOLUTION AND METHOD OF MAKING SAME

Walter H. Gunn, Painesville, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 504,383, Sept. 9, 1974, Pat. No. 3,970,482, which is a continuation-in-part of Ser. No. 298,646, Oct. 18, 1972, abandoned. This application Feb. 13, 1976, Ser. No. 657,766

Int. Cl.² C23F *7/26*; C08B *37/00*

U.S. Cl. 148—6.2 **5 Claims**

1. A stabilized aqueous composition containing solubilized xanthan gum hydrophilic colloid, which colloid in solution will otherwise support microbial growth, said composition being resistant to microbial growth while exhibiting suppressed gel formation, said composition comprising, in aqueous solution, xanthan gum hydrophilic colloid and chromic acid, said solution being at a pH above 3 and having reduced forms of chromium, if such exist, at substantially below 5 percent of the solution hexavalent chromium.

4,052,232

PHOSPHATING PROCESS

Michael Brock, Reading, and Brian Alfred Cooke, Knotty Green, both of England, assignors to Imperial Chemical Industries Limited, Great Britain

Filed June 18, 1976, Ser. No. 697,740

Claims priority, application United Kingdom, June 20, 1975, 26351/75

Int. Cl.² C23F *7/10*

U.S. Cl. 148—6.15 Z **5 Claims**

1. A process of applying a phosphate coating to a ferrous metal substrate by treating the substrate with an acidic zinc phosphate solution and a depolarizing oxidant in the presence of 1 - 100 parts of a water soluble polymer per million parts of the phosphate solution, wherein the polymer is a polyacrylic acid or a polyacrylamide of molecular weight between 150 and 5×10^5.

4,052,233

METHOD FOR GAS-AND FLUID-TIGHT SEALING OF BOREHOLES WHICH ARE THREADLESS AND UNDER PRESSURE, AND ARE MOUNTED IN A HARDENABLE RAW MATERIAL

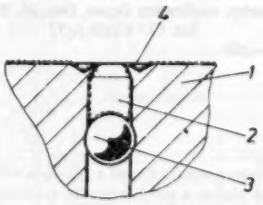
Gunther Strauff, Kaarst, Germany, assignor to Langen & Co., Dusseldorf, Germany

Filed Feb. 26, 1976, Ser. No. 661,826

Claims priority, application Germany, Feb. 26, 1975, 2508269

Int. Cl.² C21D *1/74, 7/02*

U.S. Cl. 148—12.1 **4 Claims**



1. A method for gas- and fluid-tight sealing of non-threaded boreholes in a nitridation hardenable raw material comprising the steps of:

press fitting a hardened sealing member into a borehole in an unhardened raw material hardenable by nitridation; and

hardening said raw material by nitridation at a temperature in which the initial stress which is developed by the pressing is partially retained.

4,052,234

METHOD FOR CONTINUOUSLY QUENCHING ELECTROLYTIC TIN-PLATED STEEL STRIP

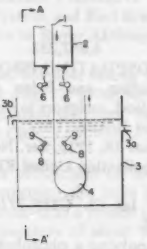
Hidehisa Yamagishi; Mizuo Tanaka, and Riichi Shiono, all of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 517,449, Oct. 24, 1974, abandoned. This application Oct. 7, 1975, Ser. No. 620,310

Claims priority, application Japan, Nov. 5, 1973, 48-123361; Nov. 6, 1973, 48-124020

Int. Cl.² C21D *9/52;* C25D *5/50*

U.S. Cl. 148—156 **10 Claims**



1. A method of continuously quenching a continuously moving electrolytic tin-plated steel strip, comprising

1. maintaining a relatively low quenching rate of from 500° to 900° C. per second by spraying a quenching liquid mist onto a continuously moving tin-plated steel strip with its tin-plated layer fused thereto with heat, in the air above the surface of a quenching liquid maintained in a quenching tank, with a quantity of said quenching liquid of from 0.002 to 0.08 liter per square meter per minute, followed by
2. passing said strip into said quenching tank containing said quenching liquid, and
3. maintaining a relatively higher quenching rate of from 1,100° to 1,300° C. per second by spraying a larger quantity of quenching liquid of at least 1.2 liters per square meter per minute under a high pressure onto said strip beneath said surface in said quenching tank.

4,052,235

METHOD OF PREVENTING OXIDATION DURING WATER QUENCHING OF STEEL STRIP

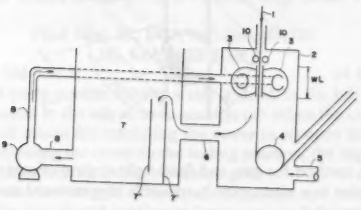
Kazuhide Nakaoka; Kenji Araki; Yoshikazu Takada, all of Yokohama; Shinobu Osaka, and Katsuhiko Hirogami, both of Fukuyama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 29, 1975, Ser. No. 617,578

Claims priority, application Japan, Dec. 24, 1974, 49-147548

Int. Cl.² C21D *9/52*

U.S. Cl. 148—156 **3 Claims**



1. A method of reducing oxidation during water quenching as part of continuous annealing of a cold-rolled steel strip, comprising the steps of quenching the steel strip from an elevated temperature between 500° to 800° C by rapidly cooling said strip by directing uniform flow cooling water sprays against each surface of said steel strip with a spray impact pressure between 40 to 170 mm Hg from a pair of symmetrical cooling-water spray units to restrain the generation of water vapor, and to thereby reduce the amount of oxidation of the strip during the water quenching to such an extent that no supplementary pickling operation is required and then subjecting said steel strip to reducing gas over-aging treatment in a shelf treating furnace.

4,052,236

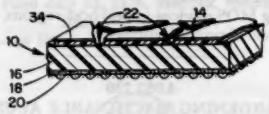
METHOD OF PREPARING IMITATION SHEET MATERIAL

Vikram C. Kapasi, Chelmsford; Henry R. Lasman, Andover, both of Mass.; Robert J. Lebenson, Northampton, N.H., and Reuben Wisotzky, Lexington, Mass., assignors to Pandel-Bradford, Inc., Lowell, Mass.

Division of Ser. No. 460,127, April 11, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,169

Int. Cl.² B29C *5/12;* B29D *27/04*

U.S. Cl. 156—85 **13 Claims**



1. A process of preparing a polymeric sheet material with a three-dimensional surface design thereon, which process comprises:

a. applying to depressed areas of an embossed release sheet having a design effect thereon a first polymer characterized by a high modulus of elongation in psi. at 100% elongation of about 2000 to 8000 psi.;
b. applying a continuous layer of a second polymer characterized by a low modulus of elongation in psi. at 100% elongation over the first polymer in the depressed areas, the difference in the modulus of elongation between the first and second polymers being no less than 800 psi.;
c. removing the release sheet to provide a polymeric sheet material composed of a continuous layer of a low modulus polymer, with raised areas composed of a high modulus polymer secured thereto; and
d. flexing the low modulus polymer in the intervening low areas between the raised high polymer areas to the polymeric sheet to form a weak-hinge effect, thereby providing a sheet material with an accentuated design effect thereon.

4,052,237

CLOSED TORUS TIRE

Paul E. Appleby, Cuyahoga Falls; Stanley J. Houck, Akron, and Richard B. Nash, Cuyahoga Falls, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

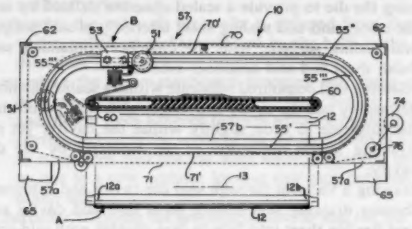
Filed Jan. 5, 1976, Ser. No. 646,716

Int. Cl.² B29H *15/00, 17/14*

U.S. Cl. 156—117 **6 Claims**

1. The method of making a closed torus tire having continuously wound cord reinforcement and comprising disposing an endless flattened empty tube coaxially about a cylindrical support to form an inflatable liner; locating a pair of inextensible endless bead cores coaxilly about said support each adjacent to a respective axial end of said tube, said cores being spaced axially apart a distance effective to determine the peripheral length of each single turn of cord wound continuously around said pair of cores; winding said cord continuously about said bead cores in a flattened oval path wherein said cord extends in substantially straight parallel lines respectively

inwardly and outwardly adjacent to said cores thereof while rotating said cores about the axis of said support in timed relation with said winding; then shifting each of said bead cores axially toward the other thereby relocating said cores



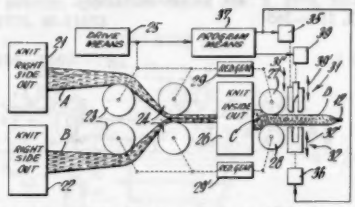
relative to the periphery of the torus of cords therearound inflating said tube; and applying a breaker belt and tread circumferentially about the cord wound liner tube and said bead cores and curing the tire.

4,052,238

METHOD OF MAKING A SCOURING PAD OR THE LIKE

George B. Botvin, Cumberland, R.I., assignor to ACS Industries, Inc., Woonsocket, R.I.

Division of Ser. No. 590,102, June 25, 1975, which is a continuation-in-part of Ser. No. 553,509, Feb. 27, 1975, Pat. No. 4,017,949. This application Apr. 2, 1976, Ser. No. 666,328
Int. Cl.² B32B *1/10*
U.S. Cl. 156—148 14 Claims



1. The method of making a scouring pad or the like which comprises loosely knitting an elongate pliant outer tube around a loosely knitted elongate pliant inner tube of stuffing material, one of said tubes being inside-out knitted with respect to the other, whereby the grain of adjacent surfaces of said tubes may be in essentially the same predominant direction, the knitted material of the outer tube including a filamentary thermoplastic element, locally compressing the outer tube upon the stuffing material at longitudinally spaced locations which include said thermoplastic element, thereby defining first and second transversely extending end alignments of a pad, locally securing the compressed materials at said alignments, such securing including the step of local heating of the thermoplastic element along said end alignments, and severing individual pads thus end-secured.

4,052,239

METHOD AND APPARATUS FOR MAKING FIBER REINFORCED TAPE

Henry T. Chen, 5212 N. Yvonne Ave., San Gabriel, Calif. 91776

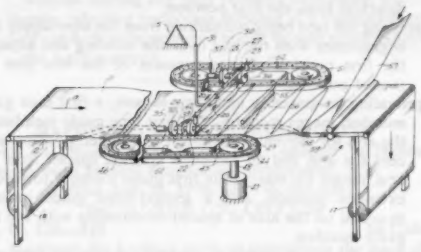
Filed Jan. 23, 1976, Ser. No. 651,737
Int. Cl.² B32B *5/08*
U.S. Cl. 156—177 12 Claims

1. A method of manufacturing a fiber reinforced tape comprising the steps of:

moving a strip of tape through a first area, looping a thread on one side of the strip of tape in a plane transverse to the direction of movement of the strip of tape in the first area with each end of the loop near the edge of the strip of tape, supporting each end of the loop as it is formed, moving each end of a single loop at a right angle to the plane of the tape in the first area into the plane of the strip of tape to deposit the thread against the strip of tape, and securing the thread to the strip of tape.

6. An apparatus for manufacturing a fiber reinforced tape comprising:

means for moving a strip of tape through a first area,



means for looping a thread on one side of the strip of tape in a plane transverse to the direction of movement of the strip of tape in the first area with each end of the loop being near the edge of the strip of tape,

means for supporting each end of the loop as it is formed,

means for moving each end of a single loop at a right angle to the plane of the tape in the first area into the plane of the strip of tape to deposit the thread against the strip of tape, and

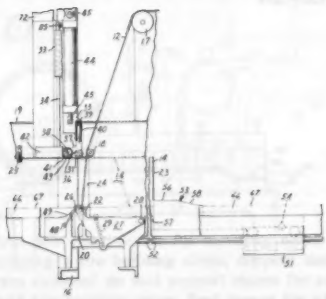
means for securing the thread to the strip of tape.

4,052,240

TAPING DEVICE AND METHOD OF TAPING

Robert A. Luhman, Cylon Township, St. Croix County, Wis., and John R. Ward, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 30, 1976, Ser. No. 682,100
Int. Cl.² B31B *1/72*
U.S. Cl. 156—212 4 Claims



1. A method for applying a length of tape coated on one side with pressure sensitive adhesive from a supply length of the tape to a box along a meeting line defined by adjacent portions of the box and extending longitudinally along one side surface of the box, said method comprising:

defining a box path adapted to affort movement of the box endwise in a first direction with the meeting line of the box along a first side of the path;

positioning an end portion of the supply length of tape transverse of the path at a first position along the box path between means on the first side of the box path for sup-

porting the supply length of the tape from which the tape may be withdrawn against a predetermined tension and means on the opposite side of the box path for releasably holding a terminal end portion of the tape, the tape being positioned with its adhesive surface facing to engage the leading surface of the box moving in the first direction along the path and to bridge the meeting line of the box;

propelling the box along the path in the first direction past the first position and to a position with the trailing surface of the box at a predetermined second position along the box path, the second position being spaced in the first direction from the first position;

pressing the tape being withdrawn from the tape supply into engagement with the box over the meeting line adjacent the first position upon movement of the box past the second position;

providing an assembly including an arm, a first tape guide member, means mounting the first tape guide member on the arm for movement between a retracted position adjacent the arm and an extended position spaced from the arm, means for biasing the first guide member toward its extended position, and a second tape guide member mounted on the arm in spaced relationship with the first guide member;

moving the arm assembly transversely across the path after the trailing surface of the box reaches the second position with the tape guided around the first and second tape guide members to extend a generally U-shaped length of the tape along the trailing surface of the box, and with the first tape guide member biased against the trailing surface to bias tape around the first tape guide member into engagement therewith and with the surface of the box along the second side of the path;

severing the tape between the first and second tape guide members at the second side of the path; and

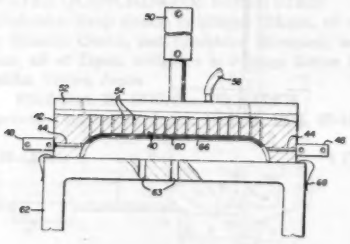
engaging the newly severed end portion of the supply length of tape extending around the second guide member with the means for releasably holding a terminal end portion of the tape by movement of the second guide member adjacent to the means for releasably holding.

4,052,241

METHOD OF FORMING A CONTOURED LAMINATE

William J. Walter, Algonac, Mich., assignor to Detroit Gasket and Manufacturing Company, Detroit, Mich.

Filed Nov. 13, 1975, Ser. No. 631,794
Int. Cl.² B29C *17/04*
U.S. Cl. 156—245 **7 Claims**



6. A method of adhesively bonding a flexible perforated finish sheet over the concave face of a contoured pervious, concavo-convex automotive headliner substrate, comprising the steps of:

a. releasably supporting said headliner substrate in a downwardly facing cavity of a contoured female die, said die cavity having a peripheral sealing surface and a concave face conforming to and receiving the convex face of said substrate;

b. positioning said perforated flexible sheet beneath said substrate on a flexible impervious sealing sheet, said sealing sheet supported and retained at its periphery on a generally planar support having a plurality of perforations therethrough;

c. applying an adhesive to one of the confronting faces of said perforated contoured substrate and said flexible sheet;

closing the die to provide a sealed chamber defined by said die cavity and said sealing sheet interiorly of said peripheral sealing surface, with the chamber containing said finish sheet and said headliner substrate;

e. releasing said contoured substrate within a sealed chamber defined by said die cavity and said flexible seal, permitting the substrate to drop slightly within the cavity, yet restraining lateral deflection of the substrate by the die cavity;

f. drawing a vacuum through said die cavity and substrate, thereby drawing said sealing sheet into said cavity and said flexible sheet into face-to-face contact with said convex face of said substrate and bonding said flexible sheet to said substrate; and

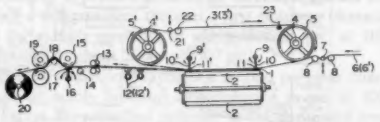
g. releasing said headliner substrate and the bonded flexible finish sheet.

4,052,242

METHOD FOR PRODUCING A PRODUCT COMPRISING WEFT WEBS OF LARGE WIDTH CONTINUED IN THE WARP DIRECTION

Masahide Yazawa; Haruhisa Tani; Masaki Matsumoto, and Yasuo Sasaki, all of Tokyo, Japan, assignors to Polymer Processing Research Institute Ltd., Tokyo and Sekisui Kacaku Kogyo Kabushiki Kaisha, Osaka, both of Japan

Filed Jan. 21, 1976, Ser. No. 651,106
Claims priority, application Japan, Jan. 28, 1975, 50-11653
Int. Cl.² B32B *31/00*
U.S. Cl. 156—265 **2 Claims**



1. A method for producing a product comprising weft webs of a large width continued side-by-side in the warp direction, which comprises:

horizontally circulating two heated belts in parallel having a hot-melt type adhesive in a tacky state on the outer peripheral surfaces thereof and spaced by the length of one of cut webs for wefts, said horizontally circulating belts having upper and lower side routes;

adhering right and left selvedge materials which constitute the right and left selvedges of final product onto the respective sides of the lower surfaces of the belts on the lower side circulating route thereof, and running said selvedge materials together with the belts;

successively loading cut webs for wefts obtained by cutting a web of a large width to a given length which corresponds to the distance between the two belts, one-by-one and at a given gap onto the surface of a conveyer horizontally circulating below the belts and in a direction perpendicular thereto;

at each time when the front and rear ends of each one of the cut webs for wefts come to the position just overlapped with the corresponding right and left selvedge materials running crosswise above the cut weft webs,

causing the two belts having the selvedge materials adhered thereon to suddenly drop over the whole of the length corresponding to the width of the cut webs for wefts, on the lower side route of the belts down onto the surface of one of the cut webs for wefts loaded on the conveyer,

thereby to adhere the front and rear ends of the cut web for

wefts onto the corresponding lower surfaces of the selvedge materials having said adhesive thereon,

and thereafter causing the belts having both the selvedge materials and the cut web for wefts adhered thereonto to suddenly rise,

whereby the cut web for wefts is stripped from the conveyer, pulled up and transferred by the belts in the warp direction;

repeating the above-mentioned dropping and rising of the belts whenever the belts with both the selvedge materials and the cut webs adhered thereon advance by the distance corresponding to the width of the cut weft webs at a speed so controlled that the cut weft webs are picked up one-by-one in a row without leaving any gaps between each other; and

thereafter stripping the selvedge materials and the cut webs for wefts adhered onto the lower surfaces thereof from the surfaces of the belts,

to thereby give a novel product of cut webs for wefts continued in the warp direction by selvedges adhered onto both the margins of the cut webs for wefts.

4,052,243

METHOD FOR PRODUCING A CROSS-LAMINATED CLOTH-LIKE PRODUCT FROM WIDE WARP AND WEFT WEBS

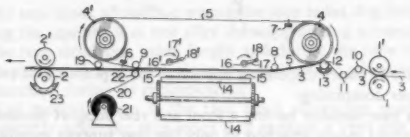
Masahide Yazawa; Haruhisa Tani; Masaki Matsumoto, and Yasuo Sasaki, all of Tokyo, Japan, assignors to Polymer Processing Research Institute Ltd., Tokyo and Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, both of Japan

Continuation-in-part of Ser. No. 651,106, Jan. 21, 1976. This application July 27, 1976, Ser. No. 709,045

Claims priority, application Japan, Apr. 5, 1976, 51-38413; Jan. 28, 1975, 50-11653

Int. Cl.² B32B *31/00*

U.S. Cl. 156—265 **4 Claims**



1. In the method for forming a crosswise structure of wide warp and weft webs without leaving any gaps between each of the weft webs in the production of a cross-laminated cloth-like product, where a warp web is continuously fed to travel in the warp direction of the product to be prepared and weft webs cut to a length corresponding to the width of the product to be prepared, are fed horizontally one by one along the line crosswise to that of production of the product and after cross-overlaid, the resulting structure of warp and wefts is fixed by a binder,

an improved method for temporarily forming a continuous row of cut weft webs arranged in side by side relationship before fixing said warp and weft structure,

which comprises:

causing a warp material to travel horizontally along the line of production of product, while intersecting the feeding line of cut weft webs carried on a conveyer and travelling horizontally and crosswise thereto and vertically apart therefrom, said warp material being wetted on the surface thereof to be opposed to the cut weft webs, with a liquid having adhesion property, and having a sufficient width for covering the width of the warp web and a sufficient effective surface area for picking up the whole of one of the cut weft webs in the flat state, when wetted with said liquid;

at each time when one of the cut weft webs comes to the position wholly overlapped with the travelling warp material, subjecting at least the part of the warp material facing the one of the cut weft webs to a sudden reciprocating vertical motion so as to touch and pick up the cut weft web by temporary adhesion to the warp material due to the action of said liquid having adhesion property; and

repeating the above-mentioned reciprocating motions of the warp material successively, whenever the warp material advances by the distance corresponding to the width of the cut weft web at a speed so controlled that the cut weft webs are picked up one by one in a row without leaving any gaps between each other, and

thereby effecting temporary forming of a continuous row of cut weft webs arranged in side by side relationship on the warp material.

4,052,244

RAPID CURING TWO PART ADHESIVE

Martin M. Skoultchi, Somerset, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Aug. 18, 1976, Ser. No. 715,529

Int. Cl.² B32B *7/00*; C09J *5/04*

U.S. Cl. 156—310 **10 Claims**

6. A process for bonding surfaces comprising the steps of:

1. applying to at least one of such surfaces an adhesive bse consisting essentially of an acrylic monomer and a saccharin component selected from the group consisting of saccharin, the copper salt of saccharin and mixture thereof, said saccharin component being present in an amount of 0.01 to 10% by weight of the monomer;

2. applying to at least one of such surfaces an activator comprising the copper salt of p-toluenesulfinic acid when only saccharin is used in the adhesive base and a salt of p-toluenesulfonic acid when the copper salt of saccharin is present in the adhesive base; and

3. placing the surfaces so treated in abutting relation until the adhesive composition polymerizes and bonds the surfaces together.

4,052,245

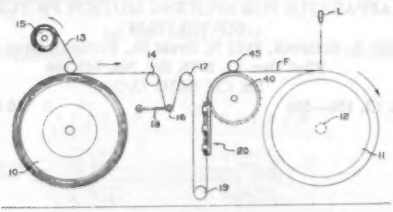
CENTERING DEVICE

Mathew Kuts, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Oct. 3, 1975, Ser. No. 619,686

Int. Cl.² B29H *17/10, 17/28*

U.S. Cl. 156—405 R **6 Claims**



1. A fabric delivering device for servicing a tire building drum comprising a tire building drum, support means, roll supply means mounted on said support means for supplying fabric to said tire building drum, feed means for advancing fabric from said roll supply means to said tire building drum, said feed means including carrier means operative to captively engage and move fabric material to said tire building drum, said carrier means includes a plurality of radially extending needles operative to pierce and engage such fabric material, a centering means located on said support means closely adjacent to said carrier means and operative to center the fabric center with the vertical median plane of said tire building drum prior to delivery of fabric to said carrier means, said centering means having a plurality of opposed rollers operative to contact the laterally spaced side edges of a fabric material passing therethrough, and said opposed rollers increasing in

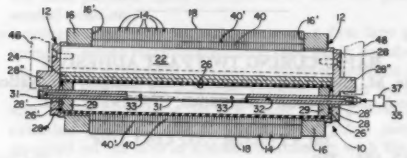
diameter progressively in the direction of feed toward said centering means to define a narrowing of the dimension between said opposed rollers.

4,052,246

STITCHER FOR TIRE BUILDING

Angel Ramon Terrado Albareda, Mersch, and Joseph Schoellen, Ettelbruck, both of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 30, 1976, Ser. No. 671,795
Int. Cl.² B29H *17/08*
U.S. Cl. 156—412 **11 Claims**



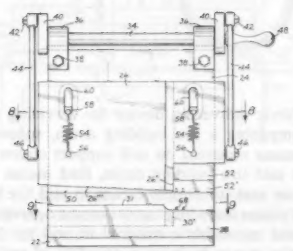
1. A multiple disc stitcher for use in building tires comprising a pair of end assemblies spaced apart and disposed in parallel opposed relation to each other, a multiplicity of outer discs of equal exterior diameter and of concentric annular form and small thickness disposed in side-by-side array between the end members, each disc being slidable relative to the respectively adjacent disc, support means providing single continuous beam support for said discs disposed within the discs and extending normal to the discs between the end assemblies, a resilient fluid pressure containing cushion member juxtaposed to the support means and extending through the discs between the end assemblies and cooperable with the support means to control the displacement of the outer discs relative to the support means, a multiplicity of inner plate members each having an arcuate outer surface slidingly engageable with respectively associated one of said outer discs and small thickness corresponding to the thickness of the associated outer disc, said plate members each having an opening therethrough accommodating said fluid pressure containing member, said outer discs being freely rotatable relative to the support means and relative to said plate members.

4,052,247

APPARATUS FOR SPLICING MOTION PICTURE SOUND FILM

Arthur A. Rothrock, 8112 N. Druid St., Portland, Oreg. 97203

Filed Dec. 13, 1976, Ser. No. 749,746
Int. Cl.² G03D *15/04*
U.S. Cl. 156—506 **10 Claims**



1. Apparatus for splicing motion picture sound film wherein the sound recorded on the sound stripe is displaced longitudinally of the related picture frame, the apparatus comprising:

a. a cutter arranged to cut motion picture sound film transversely between adjacent picture frames but not across the sound stripe, thence longitudinally from said transverse cut between the picture frames and the sound stripe to a point at which the sound relates to the first picture frame adjacent said transverse cut, thence transversely across said sound stripe, and

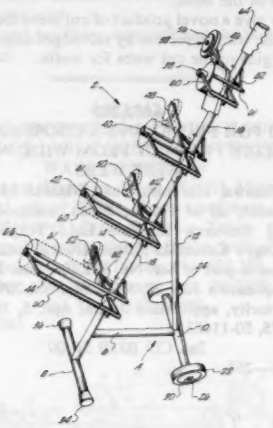
b. a splicer arranged to retain mating end portions of film cut by the cutter with the confronting edges of said mating end portions in mutual abutment, for subsequent interconnection of said mating end portions.

4,052,248

PAPER DISPENSING APPARATUS FOR ROLLS OF PAPER

Travis Lowell Hunter, La Verne, Calif., assignor to Travis Hunter, Montclair, Calif.

Filed Oct. 29, 1975, Ser. No. 626,966
Int. Cl.² B31F *5/08*; B32B *31/18*
U.S. Cl. 156—511 **10 Claims**



10. A paper dispensing apparatus for a plurality of rolls of paper comprising:

a base member having a front and rear support member;

wheel means attached to only the rear support member;

a support member attached to the base member and extending upward from the base member;

a plurality of shafts of different lengths cantilevered outward from the support member to support respective different widths of paper rolls;

a plurality of pivotally mounted pressure bars extending adjacent each shaft to bear against their respective paper rolls and relatively movable transverse to each respective shaft;

means for applying an adhesive tape to the edge of each paper roll, including a pressure bar forcing a tape against the edge of a paper, and

handle means attached to the support member for rotating the base member about the wheel means to transport the paper dispensing apparatus supported only by the wheel means.

4,052,249

FACE SEALING VALVE APPLICATOR

Roger K. Bruce, Mission Viejo, and Werner Marhold, Huntington Beach, both of Calif., assignors to Sterigard Corporation, Santa Ana, Calif.

Filed July 23, 1975, Ser. No. 598,253
Int. Cl.² B26D *9/00*; B65H *5/08*
U.S. Cl. 156—513 **12 Claims**

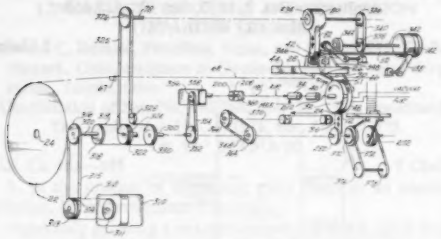
1. An apparatus for forming and applying flap-type gassing valves to closure ends of pressurized dispensers, each valve being formed from tape stock advanced along a tape path of

the apparatus and having a backing of resilient material, a vent slot, and a layer of adhesive coextensive with the backing, the apparatus comprising:

a. means for forming successive vent slots in the tape stock, the vent slot forming means including a head, means for reciprocating the head towards and away from the tape path, and a punch carried by the head to form the vent slot when the head moves towards the tape path;

b. means for advancing the tape stock along the tape path during a first interval of a cycle and in steps so that in the cycle tape stock alternately advances along the path during the first interval and is at rest on the path during a second interval of the cycle, the tape stock advancing means including a reciprocating stepping dog engageable successively with each of the vent slots during the first interval of the cycle to advance the tape stock along the path one valve length, and means to reciprocate the stepping dog along the path over a distance greater than the one valve length advance;

c. means for holding the tape stock at rest on the path during the second interval, the holding means including a stop index dog engageable successively with each of the vent slots on the path between the vent slot forming means and



the tape stock advancing means, the stop index dog holding the tape stock at rest after the stepping dog advances the tape stock one valve length and during the time the stepping dog continues along the path in the advancing direction during its reciprocation;

d. lost motion means in the tape stock advancing means operable when the stop index dog engages a vent slot in the tape to stop stepping dog advance while the tape stock advancing means tends to advance the stepping dog;

e. means for cutting the tape stock to valve length to form individual valves at a position along the path after vent slot formation, holding of the tape by the stop index dog, and tape advance by the stepping dog, the cutting means including a shear blade carried by the head, the shear blade and the punch acting on the tape while the tape is at rest during the second interval;

f. receiver means for receiving the individual valves and advancing each in turn to an activation station and a transfer station;

g. means at the activation station for activating solvent on each valve in a preselected area thereof on one side of the venting slot; and

h. means at the transfer station for bonding the valve to an end closure at the preselected area.

4,052,250

CONE LABELING, SEPARATING AND RESTACKING APPARATUS

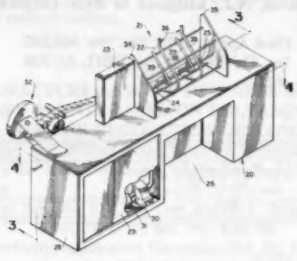
Robert G. Potts, 3007 Dodson Ave., Chattanooga, Tenn. 37406

Division of Ser. No. 497,554, Aug. 15, 1974, Pat. No. 3,981,407. This application Mar. 22, 1976, Ser. No. 669,250

Int. Cl.² B65G *59/00*; B65H *3/08*

U.S. Cl. 156—556 **3 Claims**

1. A cone labeling, separating and re-stacking apparatus comprising a magazine for storing a plurality of stalks of cones parallel to one another, said magazine having a sloped discharge area for gravity feed of stalks of cones from said magazine, a loader ram disposed adjacent to said discharge area for retaining said stalks of cones in said magazine, and means for causing reciprocal motion of said loader ram for moving a first stalk of cones and allowing a second stalk of cones to be released from said magazine, a tray for receiving said first stalk of cones, cone nose receiving means for receiving the nose end of said first stalk of cones in said tray means, said cone nose receiving means being axially aligned with said stalk of cones in said tray means, cone base receiving means axially aligned with said cone nose receiving means, labeling means for plac-



ing a label into the cone base end of said first stalk of cones, and cone separating means for separating the cone at the cone base end of said stalk of cones and moving said cone to said cone base receiving means, said cone separating means including a nozzle having a fluid passageway therein for admitting fluid under pressure between contiguous cone noses, and traverse means for moving said tray means in a direction parallel to the axis of said stalk of cones on said tray, said traverse means including index means for disposing said fluid passageway of said nozzle between successive contiguous cones of said stalk of cones.

4,052,251

METHOD OF ETCHING SAPPHIRE UTILIZING SULFUR HEXAFLUORIDE

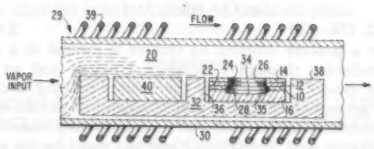
Charles Edward Weitzel, Dayton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 29, 1976, Ser. No. 736,882

Claims priority, application United Kingdom, Mar. 2, 1976, 08317/76

Int. Cl.² H01L *21/38*

U.S. Cl. 156—612 **13 Claims**



9. A process for forming blind holes in a sapphire substrate comprising:

a. depositing a first layer of silicon dioxide having a first thickness adjacent a surface of the sapphire substrate;

b. depositing a layer of silicon nitride having a second thickness, adjacent the first layer of silicon dioxide;

c. depositing a second layer of silicon dioxide, having a third thickness, adjacent the layer of silicon nitride;

d. defining a preselected pattern having at least one aperture in a mask comprised of the first layer of silicon dioxide, the layer of silicon nitride, and the second layer of silicon dioxide; and

e. exposing the mask and portions of the sapphire substrate unprotected by the mask to a vapor comprised of sulfur

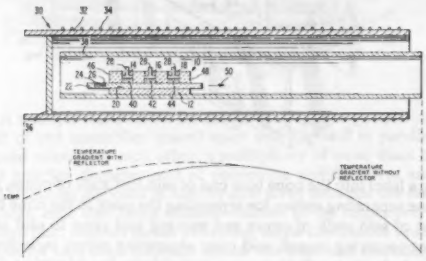
hexafluoride and a carrier gas at a temperature no greater than 1,050° C for a time period sufficient to form said blind holes.

4,052,252

LIQUID PHASE EPITAXIAL GROWTH WITH INTERFACIAL TEMPERATURE DIFFERENCE

Harry Francis Lockwood, New York, N.Y., and Michael Ettenberg, Freehold, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 4, 1975, Ser. No. 565,092
Int. Cl.[2] B01J *17/04;* H01L *21/208*
U.S. Cl. 156—622 **6 Claims**



1. A method for growing a layer of crystalline semiconductor material by liquid phase epitaxy comprising the steps of:
heating a charge composed of a semiconductor material and a solvent to melt the charge and form a solution of the semiconductor material in the solvent;
heating a substrate to a lower temperature than the solution where the temperature difference is less than 1° C;
bringing the substrate into contact with the solution;
cooling the solution and substrate at the same rate to deposit a layer of semiconductor material onto the substrate; and
removing the substrate from contact with the solution after a predetermined interval.

4,052,253

SEMICONDUCTOR-OXIDE ETCHANT

Thomas J. Kingzett, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Sept. 27, 1976, Ser. No. 726,883
Int. Cl.[2] H01L *21/316*
U.S. Cl. 156—657 **2 Claims**

1. In a process wherein an emitter is formed in a silicon semiconductor through a diffusion window and an oxide formed thereover whereafter the emitter opening is cleaned out by immersing the silicon semiconductor in an etch solution the improvement comprising an etch consisting essentially of hydrochloric acid; hydrofluoric acid and water having a PH of less than 1.

4,052,254

STRIPPING OF ELECTROPLATED NICKEL-IRON ALLOYS FROM FERROUS SUBSTRATES

Edward P. Harbulak, Allen Park, and Ronald J. Lash, Warren, both of Mich., assignors to M & T Chemicals Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 602,140, Aug. 5, 1975, and Ser. No. 602,141, Aug. 5, 1975. This application Feb. 2, 1976, Ser. No. 654,403
Int. Cl.[2] C23F *1/00*
U.S. Cl. 156—664 **55 Claims**

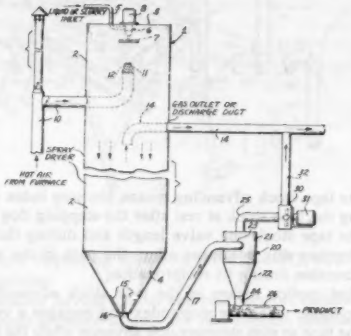
1. A process for selectively removing nickel-iron alloys from the surface of a ferrous metal substrate which comprises contacting said metal surface with an aqueous bath containing in the absence of any inhibitor to prevent corrosive attack on the substrate:
a. at least one nitro substituted organic compound containing at least one solubilizing group;
b. at least one organic amine or polyamine or substituted amine or polyamine;
c. at least one aliphatic carboxylic acid or salt thereof, or a compound which will yield said carboxylic acid or salt thereof in solution, further characterized in that additionally said aliphatic carboxylic acid or salt thereof contains at least one substituent group selected from $—NH_2$, or quaternary amine salts thereof, or —OH; and
d. at least one phosphorus oxo acid or organic phosphorus oxo acid or salts thereof or alkyl phosphonate substituted amines.

4,052,255

SPRAY DRYER DISCHARGE SYSTEM

Lowell E. Hackbarth, Bel Air; Sterling W. Pyle, Aberdeen, and Paul W. Brandon, Havre de Grace, all of Md., assignors to J. M. Huber Corporation, Locust, N.J.

Continuation of Ser. No. 187,470, Oct. 7, 1971, abandoned. This application Oct. 7, 1975, Ser. No. 620,463
Int. Cl.[2] B01D *1/18*
U.S. Cl. 159—4 B **2 Claims**



1. In a spray drying apparatus having a cylindrical drying chamber, said chamber having an upper portion and a second lower, inverted, conically-shaped, solids discharge portion; spray means for dispersing a liquid into the form of a mist of fine droplets in said upper portion of said drying chamber; conduit means for introducing a stream of hot gas into said chamber and into direct contact with said liquid droplets; exhaust conduit means for withdrawing said hot gas from said drying chamber; and a discharge outlet positioned at the apex of said inverted conically-shaped solids discharge portion for removal of particulate solids, the improved apparatus comprising the combination of:
1. a high velocity rotating disc for dispersing said liquid in the form of fine droplets in the upper portion of said drying chamber;
2. conduit means for introducing said stream of hot gas, comprising a gas distribution head provided with a series of intermittently spaced vanes which cause said stream of hot gas to be distributed radially and into direct contact with said mist of fine droplets for vaporizing said droplets, a downward flow of dry solids thereby being established within said chamber;
3. exhaust conduit means within the upper portion of said drying chamber for drawing said hot gas from the downward flow of dry solids;
4. a series of apertures cut into said conically-shaped discharge portion immediately above said discharge outlet;

5. an exhaust fan positioned downstream of said discharge outlet and in direct operable communication therewith, said exhaust fan (a) providing suction at said outlet for drawing cool ambient air into said discharge portion through said apertures, said ambient air being further cooled by expansion thereof as said air is drawn into said chamber through said apertures, and (b) drawing said cooled ambient air along with said dried solids through said discharge outlet; and
6. a solids separator intermediate of said exhaust fan and said discharge outlet, and in operative communication therewith;

cohesive solids thereby being air-conveyed from said discharge portion of said chamber and drawn immediately to said solids separator, the cooling effect of said ambient air on said dried solids tending to reduce tackiness in said solids.

4,052,256

METHOD OF DISPERSING GLASS FIBERS USING A LINEAR POLYSILOXANE AND DISPERSION OBTAINED THEREBY

Laurent C. Renaud, Pittsfield, Mass., and Clarence W. Charon, Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 493,361, July 31, 1974, abandoned. This application Feb. 4, 1976, Ser. No. 655,175
Int. Cl.[2] D21D *3/00*
U.S. Cl. 162—145 5 Claims

1. In the process of dispersing glass fibers in an aqueous solution, the improvement comprising:

vigorously agitating a mixture comprising water, glass fibers and an effective amount of a water solution of a linear polysiloxane containing at least 6 silicon atoms, each of said silicon atoms having 2 non-hydrolyzable oleophilic groups attached thereto, to uniformly disperse said glass fibers in said water.

5. An aqueous dispersion consisting essentially of:

a. water;
b. glass fibers;
c. cellulose fibers; and,
d. an effective amount of a linear polysiloxane, containing at least 6 silicon atoms and having 2 non-hydrolyzable oleophilic groups affixed to each of said silicon atoms, to hold said fibers dispersed throughout the water.

4,052,257

METHOD OF PRODUCING GLASS MATS

Homer G. Hill, Newark, Ohio, and Kenneth L. Austin, College Station, Tex., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 528,295, Nov. 29, 1974, abandoned. This application Jan. 8, 1976, Ser. No. 647,488
Int. Cl.[2] C03B *25/02;* C04B *43/02*
U.S. Cl. 162—156 10 Claims

1. A method of producing a glass mat which comprises:

a. dispersing a plurality of glass fibers in an aqueous composition to form a dispersion, said glass fibers having at least a portion of their surface in contact with an effective amount of a size comprising a methyl trimethoxysilane and a malto-dextrin, said dispersion comprising an effective amount of a nonionic guar gum and an isostearic amide;
b. withdrawing water from said dispersion to produce a glass mat; and,
c. recovering said glass mat.

4,052,258

DIBROMONITROMETHYL METHYL SULFONE SLIMICIDE

Christian T. Goralski; Thomas C. Klingler, both of Midland, Mich., and Paul A. Wolf, Augusta, Ga., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 24, 1976, Ser. No. 699,547
Int. Cl.[2] D21D *3/00;* D21H *5/22*
U.S. Cl. 162—161 3 Claims

1. A method for controlling slime-forming organisms by applying to them and to their habitats a cidal amount of a solution containing at least 50 parts per million of dibromonitromethyl methyl sulfone.

4,052,259

MANUFACTURE AND USE OF WATER-SOLUBLE AUXILIARY AGENTS BASED ON POLYAMINOAMIDES FOR THE PRODUCTION OF PAPER

Lutz Hoppe, and Rudolf Behn, both of Walsrode, Germany, assignors to Wolff Walsrode Aktiengesellschaft, Walsrode, Germany

Division of Ser. No. 517,785, Oct. 24, 1974. This application Oct. 24, 1975, Ser. No. 625,720
Claims priority, application Germany, Oct. 25, 1973, 2353430
Int. Cl.[2] D21D *3/00*
U.S. Cl. 162—164 EP 4 Claims

1. In a paper making process wherein a suspension of paper pulp fibers, pigment, and filler is formed into a web on a travelling screen, the improvement which comprises incorporating into the suspension, in an amount sufficient to produce an improved drainage, sedimentation, and floatation of paper pulp fibers, modified basic polyaminoamide results from:

a. reacting substantially equimolar portions of a polyfunctional compound selected from the group consisting of epichlorohydrin, dichlorohydrin, or mixtures thereof with a tertiary amine selected from the group consisting of trimethylamine, triethylamine, tripropylamine, tributylamine, dimethylaniline, dimethylcyclohexylamine or mixtures of any of said amines to form an ammonium compound;
b. reacting 0.2–1.8 mols of said ammonium compound with each mol of secondary amine group in a water soluble basic polyaminoamide which is a condensation product of
   1. a dicarboxylic acid,
   2. a polyalkylenepolyamine, and
   3. an aminocarboxylic acid or a lactam; and
c. said basic polyaminoamide being reacted with 0.15–0.19 mol of said polyfunctional compound per mol equivalent of secondary amino group in said polyaminoamide, before or after the reaction of step (b) has taken place.

4,052,260

METHOD OF OPERATING A NUCLEAR-POWER-GENERATING INSTALLATION WITH CLOSED GAS CYCLE AND PLANT OPERATED BY THIS METHOD

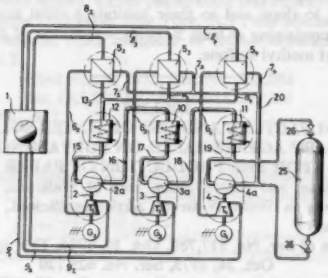
Siegfried Forster, Alsdorf; Gunter Dibelius, Aachen; Gunter Hewing, and Jasbir Singh, both of Julich, all of Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed June 10, 1976, Ser. No. 694,825
Claims priority, application Germany, June 12, 1975, 2526147
Int. Cl.[2] G21C *19/28*
U.S. Cl. 176—60 20 Claims

1. A method of operating a nuclear power plant with a closed-gas cycle which comprises the steps of:

a. heating a working gas in a total stream in a nuclear reactor and subdividing the total stream after heating into three parallel partial streams;
b. extending each of said gas streams in a respective turbine of a respective turbine set to drive a respective compressor thereof;

c. abstracting useful heat from each of the partial gas streams expanded in the respective turbines in a respective recuperative heat exchanger;
d. precooling the gas of said partial gas streams;
e. combining the gas of said partial gas streams into a lesser number of gas streams and compressing same in at least two successive stages in said compressors with at least the compressor of the last of said stages compressing all of the combined gas of said streams;



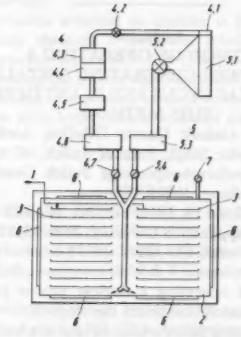
f. cooling the gas between said stages in at least one intervening cooler traversed by the combined gas of said partial gas streams;
g. subdividing the combined gas from the last of said stages into three partial streams;
h. preheating said partial streams upon subdivision in step (g) in said recuperative heat exchangers; and
i. feeding the preheated partial gas streams to said nuclear reactor for heating therein in step (a); and
j. driving electrical generators with the turbines of at least two of said sets.

4,052,261

PROCESS AND APPARATUS FOR THE FERMENTATION OF CARBOHYDRATE-CONTAINING NUTRIENT SUBSTRATE

Theodor Messing, Mulheim, and Karl H. Wamser, Moers, both of Germany, assignors to Standard-Messo Duisburg Gesellschaft Fuer Chemietechnik mit Beschraenkter Haftung & Co., Duisburg, Germany

Filed Sept. 27, 1976, Ser. No. 726,778
Claims priority, application Germany, Sept. 27, 1975, 2543307
Int. Cl.[2] C12D *1/04*; C12B *1/04*
U.S. Cl. 195—36 R **9 Claims**



1. Process for the fermentation of carbohydrate-containing nutrient substrate in the preparation of citric acid, wherein a fermentation solution is inoculated with a fermentation agent in a fermentation chamber, a layer of the fermentation agent covering the entire surface of the nutrient substrate is formed in a germination phase, and subsequently a fermentation phase is carried out, characterized in that air is pretreated to a highly sterile state and fed into the fermentation chamber during the germination phase in a quantity sufficient to maintain the chamber at a slight positive pressure; the fermentation chamber is heated separately and independently of the air supply during the germination phase; the feeding of the highly sterile air and the heating of the fermentation chamber are discontinued during the fermentation phase, and fresh, normally filtered, unconditioned air is introduced in a quantity sufficient to maintain the fermentation solution at an optimum fermentation temperature.

4,052,262

PREPARATION OF AN ALKALINE PROTEASE

Koki Horikoshi, Saitama, and Yonosuke Ikeda, Tokyo, both of Japan, assignors to Rikagaku Kenkyusho, Japan

Filed May 27, 1970, Ser. No. 40,771
Claims priority, application Japan, May 31, 1969, 44-42646; Dec. 15, 1969, 44-100818; Apr. 22, 1970, 45-34535
Int. Cl.[2] C12D *13/10*; C07G *7/02*
U.S. Cl. 195—66 R **4 Claims**

1. A process for preparing a novel alkaline protease which is a columnar crystalline powder, having a molecular weight of about 33,000 by the Archibald method, with analytical values of 48.04% carbon, 6.62% hydrogen, 16.07% nitrogen, 0.31% sulfur, the balance being oxygen, having an optimal activity at pH about 11.5, the relative activity being about 8%, 32%, 58%, 80%, 97% and 80% respectively at pH 7, 8, 9, 10, 11 and 13 with casein as the substrate, said enzyme exhibiting an isoelectric point of about 10 and a sedimentation constant of about 3,3S, comprising inoculating Bacillus sp. No. 221 (ATCC 21522) in a culture medium, in which no sugars are contained and having the composition of a carbonate, a carbon source other than a carbonate, a nitrogen source, and an inorganic material, cultering said Bacillus in said culture medium at pH 6 to 10 for a period sufficient to impart substantial proteolytic enzyme activity to said culture medium and to produce said alkaline protease in said medium, and collecting said alkaline protease from said culture medium.

4,052,263

PRODUCTION OF CHOLESTEROL ESTERASE USING *NOCARDIA CHOLESTEROLICUM*

Prakash S. Masurekar, Webster, and Charles T. Goodhue, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,690
Int. Cl.[2] C12D *13/00*; C07G *7/02*; C12B *1/20*
U.S. Cl. 195—66 R **4 Claims**

1. A method for the production of cholesterol esterase which comprises:
growing a bacterium selected from Nocardia cholesterolicum species NRRL 5767 and NRRL 5768 in a medium comprising a cholesterol esterase inducer and at least 10 g./liter of yeast extract and
separating the cholesterol esterase from the bacterium.

4,052,264

AGAR-BASE GELLING PRODUCTS

Horst Kragen, Velizy Villacoublay, Yvelines, France, assignor to Ceca S.A., Yvelines, France

Filed Mar. 3, 1976, Ser. No. 663,494
Claims priority, application France, Mar. 4, 1975, 75.06734; Dec. 29, 1975, 75.39975
Int. Cl.[2] C12K *1/10*
U.S. Cl. 195—100 **9 Claims**

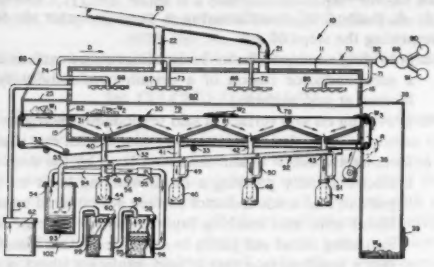
1. A bacteriological culture medium containing agar and galactomannane as gelling agents, said galactomannane being present in an amount effective to gel the medium up to 40% of said gelling agents.

4,052,265

PROCESS FOR THE PYROLYTIC TREATMENT OF ORGANIC, PSEUDO-ORGANIC AND INORGANIC MATERIAL

Klaus M. Kemp, 2410 Anacapa St., Santa Barbara, Calif. 93105

Division of Ser. No. 492,010, July 26, 1974, Pat. No. 3,945,890.
This application Jan. 12, 1976, Ser. No. 648,050
Int. Cl.[2] C10B *47/20, 53/02, 57/08*
U.S. Cl. 201—2.5 3 Claims



1. A process for transformation of the chemical structure of organic matter, pseudo-organic and inorganic materials into recoverable useful compounds, or forms, by pyrolytic conversion, comprising the steps of:

a. conveying material continuously through a pyrolytic chamber;

b. restricting air flow into the pyrolytic chamber so as to result in negligible oxidation of the material;

c. heating the material with radiant heat to progressively cause decomposition by thermal breakdown resulting in the conversion of the material to product gaseous, vapor, liquid and solid constituents;

d. maintaining the pyrolytic chamber at a pressure at least as great as the ambient pressure to thereby substantially prevent the material from being exposed to air and any other oxidizing agents in the ambient atmosphere during heating;

e. applying a pressure gradient which continuously guides the gaseous-vapor stream with entrained droplets and particulates immediately upon formation through a bottom portion of the pyrolytic chamber formed with a plurality of troughs having sloping walls, from said troughs into corresponding take-off tubes, and from said take-off tubes into corresponding collection containers;

f. selectively condensing, collecting and recovering for reuse liquid condensate fractions obtained from said gaseous vapor stream through the use of a series of temperature controlled primary and secondary condensers connected via a fluid transfer manifold to the top of said collection containers;

g. collecting and recovering for reuse the gaseous constituents of said gaseous-vapor stream;

h. scrubbing the non-condensible portion of said gaseous contituents with adsorptive and absorptive scrubbers to remove droplets, particulates and pollutents;

i. accumulating the solid products of the pyrolytic conversion process at the exit end of the pyrolytic chamber;

j. cooling, sorting and continuously conveying away the solid products for reuse; and

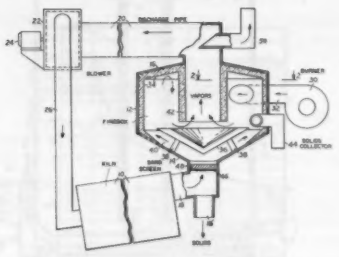
k. diverting combustible gas and vapor constituents of the product gaseous-vapor stream to a combustion chamber wherein the combustible gas and vapor constituents are burned and heat is thereby generated for the pyrolytic process, and wherein the combustion chamber is separated from the pyrolytic chamber by a heat transfer barrier.

4,052,266

METHOD AND APPARATUS FOR PURIFYING PROCESS WASTE EMISSIONS

Joseph W. Griffith, 8705 SW. White Court, Portland, Oreg. 97225

Filed May 11, 1973, Ser. No. 359,475
Int. Cl.[2] C10B *47/00;* F23D *13/20;* F23B *3/00*
U.S. Cl. 201—15 6 Claims



1. Apparatus for purifying process vapor-laden waste emissions, comprising

a. a chamber closed at both ends by end walls,

b. an oxidizing air-fuel burner having an outlet communicating with the interior of the chamber for causing the gases of combustion to move therein at high speed,

c. a waste emission inlet at one end of the chamber communicating the interior of the chamber with a source of waste emissions,

d. a vapor outlet communicating with the interior of the chamber downstream from the inlet and upstream from the end of the chamber opposite said inlet, said outlet being offset from said inlet for causing the flow of waste emissions to reverse directions between said inlet and outlet, whereby to delay the exit of vapors from the chamber until the combustible content of the air-fuel mixture and waste emissions have been substantially completely oxidized, said offset providing an indirect path of travel of waste emission particles from the inlet to the outlet, whereby further to delay the exit of vapors from the chamber,

e. the portions of the chamber and outlet which are contacted by the gases of combustion being constructed of material characterized by having a surface capable of being heated to and maintained at a temperature exceeding the ignition temperature of the air-fuel mixture and by a mass capable of insulating said surface against exterior cooling below said ignition temperature.

4,052,267

WATER DISTILLER

Richard McFee, 852 Ostrom Ave., Syracuse, N.Y. 13210

Filed July 7, 1975, Ser. No. 593,379
Int. Cl.[2] B01D *3/00, 5/00*
U.S. Cl. 202—185 B 8 Claims

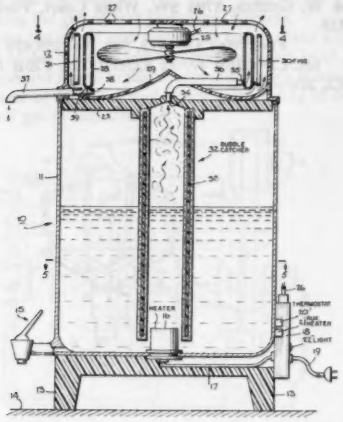
1. A water distiller comprising

a housing defining a raw water storage space;

a heater disposed in said housing for vaporizing water in said space; and

a cap removably mounted on said housing in sealed relation to said housing, said cap having a radiator therein in communication with said raw storage space to receive a flow

of vapor therefrom, a fan for blowing air over said radiator to condense the vapor therein to water and an outlet



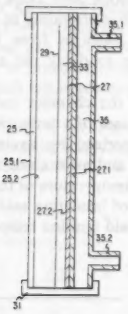
connected to said radiator for dispensing the water therefrom.

4,052,268

METHOD FOR THE DETECTION AND MEASUREMENT OF NITRIC OXIDE, NITROGEN DIOXIDE AND MIXTURES THEREOF

Keith F. Blurton, Yorktown, N.Y., and John M. Sedlak, Norwalk, Conn., assignors to Energetics Science, Inc., Elmsford, N.Y.

Division of Ser. No. 517,648, Oct. 24, 1974, abandoned. This application Apr. 8, 1976, Ser. No. 675,062
Int. Cl.² G01N *27/46*
U.S. Cl. 204—1 T **6 Claims**



1. A method for electrochemically detecting a gas selected from the group consisting of NO, NO_2 and mixtures thereof including the steps of (1) feeding a gaseous sample containing said gas to the anode of an electrochemical cell comprising an anode, a reference electrode, a cathode, and an aqueous electrolyte in contact with said anode, cathode, and reference electrode, said anode comprising a gold catalyst bonded to a hydrophobic material to provide diffusion electrode; (2) maintaining said anode at a fixed potential of in excess of 1.5 up to about 1.9 volts with respect to the potential of the reversible hydrogen couple in the electrolyte of said cell; and (3) measuring the current flowing between said anode and cathode of said cell to quantitatively determine the amount of said NO, NO_2 and mixtures therof in said gaseous sample.

4,052,269

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE AND SEMICONDUCTOR DEVICE MANUFACTURED BY USING SAID METHOD

Jacques Michel, Limeil Brevannes, and Michel Iost, Boussy Saint Antoine, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 8, 1976, Ser. No. 730,939
Claims priority, application France, Oct. 15, 1975, 75.31520
Int. Cl.² C25D *5/02*; C23C *15/00*
U.S. Cl. 204—15 **8 Claims**

1. A method of manufacturing a semiconductor device, comprising the steps of:

a. providing a semiconductor body comprising a surface and a semiconductor region of a certain conductivity type located at said surface;

b. providing on said surface at said semiconductor region an electrically insulating layer comprising at least one island,

c. forming a window in said insulating layer by the steps of:

i. electrolytically growing a metal masking layer on the parts of said semiconductor surface not covered by said island until said masking layer over the edge of said insulating island and partly over said insulating island so that a small surface part of said insulating island is uncovered,

ii. then removing said insulating layer at the area of said surface part by ion bombardment so as to form said window, removing said masking layer at most only partly by said ion bombardment, and

iii. removing entirely said masking layer,

d. providing a metal contact layer on said insulating layer and in said window, said contact layer portion located within said window forming a rectifying metal-semiconductor contact with said semiconductor surface.

4,052,270

METHODS FOR MANUFACTURING PELLET SIZING SCREEN RODS

Dean R. Ealien, and James Salnick, both of Abrams, Wis., assignors to Ultra Plating Corporation, Green Bay, Wis.

Division of Ser. No. 581,092, May 27, 1975, Pat. No. 4,012,309. This application Nov. 26, 1976, Ser. No. 745,398
Int. Cl.² C25D *7/00, 5/36*
U.S. Cl. 204—25 **4 Claims**

1. A method for applying chromium plating to a stainless steel member having a high chromium content comprising the steps of: abrading the surface of said stainless steel member to expose sub-surface impurities; cleaning the surface of said stainless steel member by exposing it to a descaler to remove foreign matter therefrom; submerging at least a portion of the cleaned and abraded surface of said stainless steel member in a plating bath in spaced relationship from lead alloy plating anode means in said plating bath; initiating electric current flow in said bath between the submerged portion of said stainless steel member and said lead alloy plating anode in such direction to effect etching of said submerged portion of said stainless steel member; reversing said electric current flow to effect chromium plating of said submerged portion of said stainless steel member; and increasing the voltage and amperage of said electric current flow in a plurality of discrete stages, each stage being a predetermined interval of time.

4,052,271

METHOD OF MAKING AN ELECTRODE HAVING A COATING CONTAINING A PLATINUM METAL OXIDE THEREON

Henri Bernard Beer, Heide-Kalmthout, Belgium, assignor to Diamond Shamrock Technologies, S.A., Geneva, Switzerland

Continuation of Ser. No. 528,867, Dec. 2, 1974, abandoned, which is a division of Ser. No. 237,969, March 24, 1972, Pat. No. 3,864,163, which is a division of Ser. No. 75,726, Sept. 25, 1970, Pat. No. 3,711,385, which is a continuation-in-part of Ser. No. 549,194, May 11, 1966, abandoned. This application June 25, 1976, Ser. No. 699,807

Claims priority, application United Kingdom, May 12, 1965, 20133/65

Int. Cl.² C25D *11/34, 13/02*

U.S. Cl. 204—38 A 16 Claims

1. A method of making an electrode comprising forming on at least part of the surface of a core of a film-forming metal a layer containing at least one platinum metal taken from the group consisting of platinum and alloys of platinum with at least one of the metals iridium, rhodium, palladium, ruthenium and osmium, the amount of platinum metal being sufficient, when converted to the oxide thereof, to be effective for carrying out electrolysis, and electrolyzing the thus metal coated core by connecting the core with the layer thereon as an anode in a sulfuric acid solution and electrolyzing the core with a combination of direct and alternating current until the platinum metal in at least the outside portion of the layer is oxidized to a depth of at least about 0.054 microns.

8. A method of making an electrode comprising forming a material containing as a substance effective to carry out electrolysis at least one oxide of a platinum metal taken from the group consisting of platinum, iridium, rhodium, palladium, ruthenium and osmium, and alloys of these metals with each other, and electrophoretically applying the material to at least a part of the surface of a core of a film-forming metal to form a layer on said part of the surface of the core, which layer is at least 0.054 microns thick.

16. A method of making an electrode comprising forming an electrolyte which is a hydrochloric acid solution containing a salt of platinum, the amount of platinum salt being sufficient, when converted to the oxide of platinum, to be effective for carrying out electrolysis, inserting at least part of the surface of a core of a film-forming metal into the solution, and carrying out electrolysis using the immersed core as an anode in the electrolyte and using a direct and an alternating current together, the electrolysis being carried out for a time sufficient to form a layer which is at least 0.054 microns thick for causing a layer to be formed on the part of the surface of the core which contains, as a material effective for carrying out electrolysis, platinum oxide.

4,052,272

METHOD OF DEPOSITING METAL CONDUCTING PATTERNS ON LARGE AREA SURFACES

James Cleary McGroddy, Putnam Valley, and Bruce Albert Scott, Pleasantville, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1976, Ser. No. 755,888

Int. Cl.² C25D *5/02, 5/54;* G03G *13/22*

U.S. Cl. 204—15 6 Claims

1. A method for depositing metal conducting patterns on large area surfaces including the steps of:

a. photochemcially depositing organic π-electron donor-halide salt onto a substrate in a predetermined pattern and

b. simultaneously electrolytically depositing a metal film according to said predetermined pattern while removing said organic π-electron donor halide salt.

4,052,273

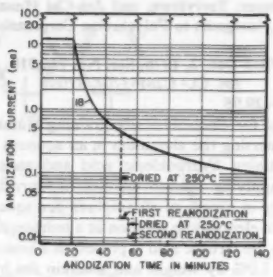
METHOD OF ANODIZING POROUS TANTALUM

Bernard S. Aronson, Elmira, and James A. Murphy, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed June 10, 1974, Ser. No. 477,676

Int. Cl.² C25D *5/50, 11/00*

U.S. Cl. 204—37 R 4 Claims



1. The method of anodizing a porous tantalum pellet comprising the steps of

providing a porous tantalum pellet,

preparing an anodizing bath of an aqueous nitric acid solution,

disposing said pellet in said anodizing bath,

passing an electrical current of up to 90 ma. per gram of pellet weight through said period of at least 30 minutes, said current being substantially constant until a predetermined desired voltage is reached and thereafter said voltage remaining substantially constant,

removing said pellet from said bath,

heating said pellet to at a temperature of between 150° C. and 300° C., maintaining said pellet at said temperature for at least 3 minutes to dry out the pores therein,

returning said pellet to said anodizing bath, passing an electrical current through said pellet at a voltage up to about said predetermined desired voltage for at least one minute, and thereafter

removing said pellet from said bath.

4,052,274

ELECTROCHEMICAL WIRE CUTTING METHOD

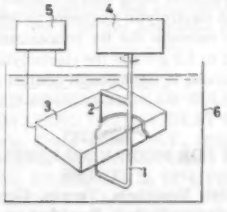
Kunio Chikamori, Tokyo, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Mar. 22, 1976, Ser. No. 669,206

Claims priority, application Japan, Apr. 5, 1975, 50-41629

Int. Cl.² B23P *1/12*

U.S. Cl. 204—129.43 7 Claims



1. In a method of electrochemical machining in which a work blank member and a cathode member are disposed opposite each other in an electrolyte, a pulsed electric current having a pulse width of 0.01 to 10 ms and a duty factor of not more than 0.5 is passed between said members while one of said members is moved relative to the other member, the cathode member being a thin wire having two end portions

mounted on a support and a central portion intermediate said end portions, the improvement which comprises said central portion being laterally offset from a straight line connecting said end portions.

4,052,275

PROCESS FOR ELECTROLYTIC GRAINING OF ALUMINUM SHEET

Robert Gumbinner, Tarrytown, and Jen-Chi Huang, Yonkers, both of N.Y., assignors to Polychrome Corporation, Yonkers, N.Y.

Filed Dec. 2, 1976, Ser. No. 746,918
Int. Cl.[2] C25F *3/04, 3/00*
U.S. Cl. 204—129.95 **5 Claims**

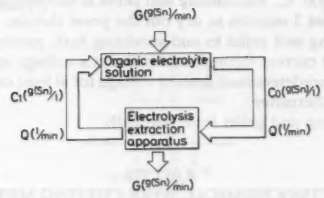
1. A method for electrolytically graining aluminum which comprises immersing the aluminum in an aqueous electrolytic solution containing hydrochloric acid and tartaric acid as electrolytes, applying thereto an electric current having a current density in excess of 40 amperes per square foot and maintaining the electrolytic solution at a temperature of about 45° C wherein the tartaric acid is present in a concentration of from 0.2% to 1.0% by weight and wherein the hydrochloric acid is present in a concentration of from 0.75% to 3.5% by weight.

4,052,276

TREATMENT PROCESS FOR ELECTROLYTIC PURIFYING OF USED SOLUTION FOR ELECTROLYTIC TIN PLATING

Minoru Yoshida; Susumu Yamaguchi, and Yoshihiko Hirano, all of Himeji, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Apr. 14, 1976, Ser. No. 676,668
Int. Cl.[2] C25D *5/50*; C25C *1/14*
U.S. Cl. 204—130 **11 Claims**



1. In an electrolytic tin plating process wherein a material is subjected to a tin melting treatment and prior to the melting treatment, the material is contacted with a solution of an organic electrolyte, the improvement which comprises the organic electrolyte, after being used to contact the material being subjected to an electrolytic treatment to deposit the tin therefrom so as to maintain the tin concentration therein in the range from 0.2 to 5.0 g/l and the electrolytically treated solution being returned to the material contact step.

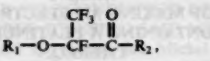
4,052,277

PROCESS FOR PREPARING PERFLUORINATED ETHERS

Thomas Martini, Neuenhain, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 12, 1976, Ser. No. 704,689
Claims priority, application Germany, July 12, 1975, 2531511
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—158 R **5 Claims**

1. Process for the preparation of perfluorinated ethers, which comprises exposing perfluoro-carbonyl compounds of the formula II



wherein R_1 and R_2 mean identical or different perfluoroalkyl radicals optionally containing one or several ether-like bound oxygen atoms in a liquid phase to light rays having a wave length of from 180 to 600 m μ.

4,052,278

FINELY DIVIDED, IRRADIATED TETRAFLUORETHYLENE POLYMERS

Michael Trevenen Brown, Welwyn Garden City, and William George Rodway, Welwyn, both of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 346,243, March 30, 1973, abandoned, which is a continuation-in-part of Ser. No. 267,035, June 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 111,700, Feb. 1, 1971, abandoned. This application Aug. 16, 1974, Ser. No. 498,219
Claims priority, application United Kingdom, Feb. 3, 1970, 5037/70; Sept. 17, 1971, 43436/71
Int. Cl.[2] C08F *2/46, 8/00*
U.S. Cl. 204—159.2 **4 Claims**

1. An unsintered powder of a coagulated dispersion grade of a homopolymer of tetrafluoroethylene or a copolymer of tetrafluoroethylene with up to 10% by weight of the copolymer, of an ethylenically unsaturated comonomer, characterised in that the powder has been irradiated by gamma radiation until it has received a dose of from 2 to 50 M Rad, has a particle size of 3 to 5 microns measured optically, a surface area of 3–7 m^2/gm, and a sheen gauge result measured by the sheen gauge test of at least 1, 2, 5, 20, smear.

4,052,279

HYDROXY AROMATIC COMPOUND CONTAINING SULFUR AND AN ORGANIC PHOSPHONATE AS POLYMER ANTIOXIDANT

Bernard J. Lyons, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 513,864, Oct. 10, 1974, and a continuation-in-part of Ser. No. 405,554, Oct. 11, 1973, abandoned. This application Apr. 8, 1976, Ser. No. 675,065
Int. Cl.[2] C08F *8/00, 8/34, 2/46*
U.S. Cl. 204—159.15 **35 Claims**

1. A polymer composition having improved resistance to oxidation comprising a polymer susceptible to oxidation and an anti-oxidant effective amount of a composition comprising a non-metallic hydroxy aromatic compound having at least one sulfur atom attached to an aromatic carbocyclic ring and an organic phosphonate compound having the general formula

wherein any two or all three of R, R', and R'' may be the same or different and may contain further phosphonic moieties and wherein R is independently selected from the group consisting of substituted and unsubstituted alkyl, alkenyl, aryl, aralkyl, alkylaryl and triazine and wherein R' and R'' are independently selected from the group consisting of substituted and unsubstituted alkyl, alkenyl, aryl, alkylaryl, aralkyl and triazine wherein R' and R'' can be linked together to form a ring.

4,052,280

UV CURING OF POLYMERIZABLE BINDERS

Vincent D. McGinnis, Valley City, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,295
Int. Cl.[2] C08F 8/00, 2/46
U.S. Cl. 204—159.14 6 Claims

1. A protective coating composition for application of a protective coating surface film to a substrate, the coating composition containing an ultraviolet curable polymeric binder of ethylenically unsaturated polymer being reactive to ultraviolet energy and photocurable by free-radical induced addition polymerization of the ethylenic double bonds, the improvement comprising:

said ethylenically unsaturated polymer containing at least about 2% of an ultraviolet photosensitizer attached to the polymer structure; and

said ultraviolet photosensitizer being connected to the polymer structure in a spaced relationship with said ethylenic unsaturation by an intervening polymer chain having a molecular weight of at least about 100, and said intervening polymer chain having between 2 and 50 repeating polymer units.

4,052,281

METHOD FOR PRODUCTION OF SULFHYDRYL COMPOUNDS

Bobby F. Dannels, and Emil J. Geering, both of Grand Island, N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 535,631, Dec. 23, 1974, Pat. No. 3,992,289.
This application Oct. 4, 1976, Ser. No. 730,031
Int. Cl.[2] C08F 2/46; B01J 1/10
U.S. Cl. 204—159.22 13 Claims

1. In a process for the formation of a sulfhydryl-terminated polythioether which comprises the steps of

1. Condensing an allene compound and hydrogen sulfide in liquid phase to produce a sulfhydryl-terminated hydrocarbon,
2. Recovering the sulfhydryl-terminated hydrocarbon,
3. Condensing the recovered sulfhydryl-terminated hydrocarbon with an unsaturated hydrocarbon having at least one acetylenic bond or at least two ethylenic bonds to obtain the sulfhydryl-terminated polythioether,

the improvement which comprises carrying out the step 1 reaction at a reaction temperature of about −100° to about 95° Centigrade, a reaction pressure of about 0 to about 3000 p.s.i.g. and a molar ratio of hydrogen sulfide to the allene compound of about 1:1 to about 20:1 in the presence of ultraviolet light of wavelength substantially above about 2600 Angstroms to obtain a sulfhydryl-terminated polythioether substantially devoid of color.

4,052,282

PHOTOCURABLE FLEXIBLE ORTHOPEDIC BANDAGE

Kanemitsu Kubushiro, Ami, Japan, assignor to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Oct. 8, 1975, Ser. No. 620,844
Int. Cl.[2] C08F 2/46, 4/00
U.S. Cl. 204—159.23 17 Claims

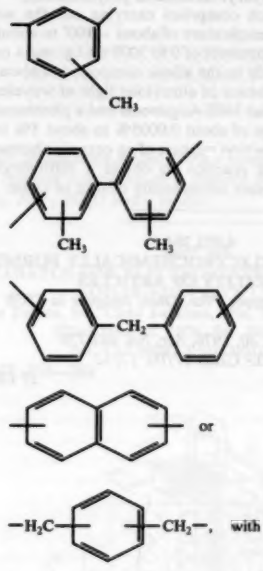
1. A storage-stable flexible photocurable orthopedic material such as bandage or splint for application to a body member, said orthopedic material comprising a flexible fabric, a photosensitizer and a photocurable tacky composition impregnated in the fabric, said tacky composition being a reaction product obtained by reacting a reaction product (D) of

A. at least one hydroxyalkyl acrylate or hydroxyalkyl methacrylate, wherein said hydroxyalkyl portion contains 2 or 3 atoms and

B. 0.55 to 3 moles, per mole of said acrylate, of at least one diisocyanate of the following formula

OCN—R_1—NCO

wherein R_1 represents $(CH_2)_6$,



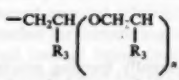
or

with

C. at least one polyhydric alcohol of the following formula

$R_2(OOH)_m$

wherein R_2 represents a straight-chain or branched chain saturated aliphatic hydrocarbon group containing 2 to 8 carbon atoms, a cycloaliphatic hydrocarbon group, or the group



in which n is a number of 1 to 4 and R_3 is a hydrocarbon atom or a methyl group, and m is 2,

wherein the amount of the polyhydric alcohol (C) is one which affords 1.05 to 1.50 equivalents, of hydroxyl groups based on the isocyanate groups remaining in the reaction product (D),

said reaction product of (D) and (C) containing at least one compound having at least two carbon-carbon double bonds capable of being polymerized and crosslinked by light and being substantially free from free isocyanate groups.

4,052,283

SENSITIZED PRODUCTION OF SULFHYDRYL COMPOUNDS USING ULTRAVIOLET RADIATION

Bobby F. Dannels, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 535,632, Dec. 23, 1974, Pat. No. 3,992,274.
This application Oct. 4, 1976, Ser. No. 729,457
Int. Cl.[2] C08F 2/46; B01J 1/10
U.S. Cl. 204—159.23 17 Claims

1. In a process for the production of a sulfhydryl-terminated polythioether which comprises the steps of

1. condensing an allene compound and hydrogen sulfide in liquid phase to produce a crude sulfhydryl-terminated hydrocarbon product,

2. polymerizing said crude sulfhydryl-terminated hydrocarbon product with an unsaturated hydrocarbon having at least one acetylenic bond or at least two ethylenic bonds to obtain the sulfhydryl-terminated polythioether,

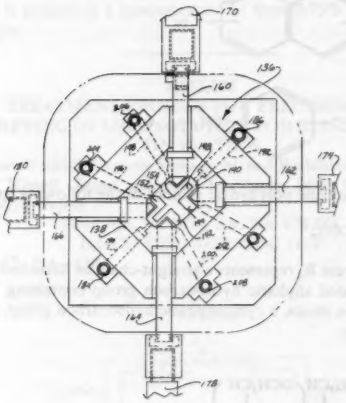
the improvement which comprises carrying out the step 1 reaction at a reaction temperature of about −100° to about 90° Centigrade, a reaction pressure of 0 to 3000 p.s.i.g. and a molar ratio of hydrogen sulfide to the allene compound of about 1:1 to about 20:1 in the presence of ultraviolet light of wavelength substantially above about 2600 Angstroms and a photosensitizing amount in the range of about 0.0005% to about 5% based on the weight of the reaction mixture of an organic photosensitizing reagent for said reaction to obtain a sulfhydryl-terminated thioether polymer substantially devoid of color.

4,052,284

APPARATUS FOR ELECTROCHEMICALLY FORMING A PLURALITY OF ARTICLES

Gustav E. Schrader, Pepper Pike, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed Apr. 30, 1976, Ser. No. 681,779
Int. Cl.² C25D 17/00, 17/12
U.S. Cl. 204—224 M **27 Claims**



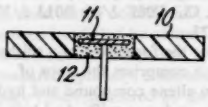
3. An apparatus for at least partially forming articles by electrolytically removing material from a workpiece having opposing sides and at least partially composed of an electrically conductive material, said apparatus comprising working chamber means for receiving at least a portion of the workpiece, means for holding at least a portion of the workpiece in said working chamber means, first and second separately movable electrode means at least partially disposed in said working chamber means for use in effecting the electrolytic removal of material from opposite sides of the workpiece to at least partially form opposing side surfaces of an article, said first and second electrode means being movable toward each other through working strokes during which material is electrolytically removed from opposite sides of the workpiece, said first and second electrode means being movable away from each other through return strokes after material has been electrolytically removed from opposite sides of the workpiece, third and fourth separately movable electrode means spaced apart from said first and second electrode means and at least partially disposed in said working chamber means for use in effecting the electrolytic removal of material from opposite sides of the workpiece to at least partially form opposing side surfaces of an article, said third and fourth electrode means being movable toward said first and second electrode means and toward each other through working strokes during which material is electrolytically removed from opposite sides of the workpiece, said third and fourth electrode means being movable away from said first and second electrode means and away from each other through return strokes after material has been electrolytically removed from the workpiece, means for supporting each of said electrode means for movement relative to each of the other electrode means during movement of said electrode means through their working and return strokes, means for establishing an electrical potential between the workpiece and each of said electrode means during movement of each of said electrode means through its working stroke, means for establishing a flow of electrolyte between the workpiece and each of said electrode means during movement of each of said electrode means through its working stroke, and means for simultaneously moving each of said electrode means through working strokes toward each other while the electrical potential is established between each of said electrode means and the workpiece and during the flow of electrolyte between each of said electrode means and the workpiece to effect the electrolytic removal of material from the workpiece.

4,052,285

ION SELECTIVE ELECTRODES

John Vincent Dobson, Hartlepool, England, assignor to National Research Development Corporation, London, England

Filed Mar. 20, 1975, Ser. No. 560,238
Int. Cl.² G01N 27/46, 27/36
U.S. Cl. 204—195 G **32 Claims**



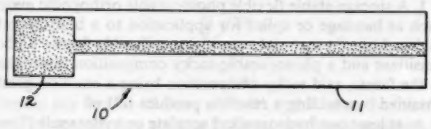
1. Ion sensitive electrode means, including a matrix of low conductivity material containing particles of an ion sensitive material selected from the group consisting of a finely divided ion sensitive glass and a finely divided mica, the ion sensitive material having an outer hydrated layer thereon, and contact means for allowing direct electrical coupling with the interface formed when the matrix is in contact with a liquid.

4,052,286

SOLID SENSOR ELECTRODE

Don N. Gray, Sylvania, Ohio, and George G. Guilbault, New Orleans, La., assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Jan. 31, 1973, Ser. No. 328,360
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 R **9 Claims**



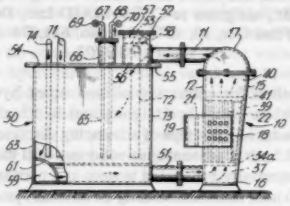
1. In a sensor electrode having a noble metal sensing surface adapted for direct contact with a test specimen, the improvement wherein said sensing surface comprises the composite, solid-state, fusion product of a mixture of noble metal powder and powdered glass, fused to an inert substrate.

4,052,287

ELECTROLYTIC SYSTEM AND NOVEL ELECTROLYTIC CELLS AND REACTOR THEREFOR

G. Oscar Westerlund, Vancouver, Canada, assignor to Gow Enterprises Limited, Vancouver, Canada

Filed June 8, 1976, Ser. No. 693,888
Claims priority, application Canada, Apr. 1, 1976, 249382
Int. Cl.[2] C25B *15/08, 9/00*
U.S. Cl. 204—237 32 Claims



1. An improved closed loop system for effecting an electrolysis reaction and for subsequently removing reacted products of electrolysis said system comprising an electrolyzer, a reactor, a major liquor outflow means from said electrolyzer to said reactor and a major liquor inflow means from said reactor to said electrolyzer:

1. said electrolyzer including a plurality of electrically interconnected electrolytic cells, said electrically interconnected electrolytic cells including a selected cell and other cells, said other cells also being provided with liquor conduit means leading between said cells to said selected electrolytic cell, and liquor conduit means leading from said selected electrolytic cell to said other cells, said selected cell being provided with liquor outlet means connected directly to said major liquor outflow means, and liquor inlet means connected directly from said major liquor inflow means for removal of liquor and entrained and/or entrapped gaseous products of electrolysis from said electrolyzer and return of degasified liquor to said electrolyzer; and

2. said reactor means including degasifier means disposed atop said reactor means, and connected directly to said major liquor outflow means, said degasifier means including an upper gas outlet means for withdrawal of the separated gases, and a lower outlet slot directly connected to an upper zone of said reactor means, for the introduction of the substantially gasfree liquor into said reactor means, said reactor means including a lower liquor channelling means, connected to said major liquor inflow means to recirculate liquor back to said electrolyzer, conduit means for the introduction of fresh liquor, to said reactor conduit means for the introduction of a pH adjusting liquid, to said reactor and indirect cooling means coupled to said reactor.

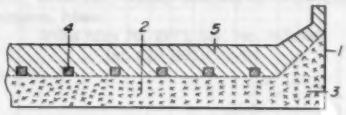
4,052,288

PROCESS FOR BRASQUING FUSED ELECTROLYSIS CELLS

Jean-Marie Sala, La Coruna, Spain, assignor to Aluminium Pechiney, Lyon, France

Filed Jan. 11, 1977, Ser. No. 758,490
Claims priority, application France, Jan. 13, 1976, 76.01193
Int. Cl.[2] C25C *3/08;* C25B *11/12;* F27D *1/16*
U.S. Cl. 204—243 R 7 Claims

1. A process for brasquing the base and lateral walls of a cell for the fused electrolysis of alumina from the recovery of used brasques by treating the ground carbon-containing and refractory products of the used base and walls by a known process with filtration of the insoluble constituents, wherein the improvement consists of the steps of (a) covering the base and lateral walls of the cell with a heat-insulating bed consisting of a mixture of carbon, NaF, CaF_2, Al_2O_3, Na_2SO_4 and $CaSO_4$; and (b) providing cathode means on the heat-insulating bed with electrically conductive current feeder elements contained



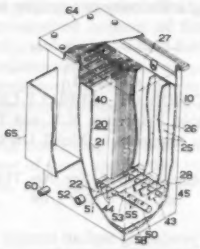
therein, the cathode means being a brasque paste derived from used brasque consisting of a mixture of carbon, NaF, CaF_2, Al_2O_3, AlF_3, Na_2O and a binder.

4,052,289

APPARATUS FOR ELECTROSTATICALLY PURIFYING NON-CONDUCTIVE LIQUID

Torao Tobisu, 9-5, Chuo 1-chome, Ota, Tokyo, Japan

Filed June 28, 1976, Ser. No. 700,123
Int. Cl.[2] B03C *5/02;* B01D *17/06*
U.S. Cl. 204—302 6 Claims



1. An apparatus for electrostatically purifying non-conductive liquids comprising:

a tank;

a plurality of anode and cathode plates disposed in an interleaved opposed relationship within said tank;

a conduit for introducing liquid to be treated into said tank, said conduit being disposed below lower edges of said electrode plates and having apertures at the upper surface thereof for dispersing liquid between said electrodes;

a plurality of particle collecting members made of porous dielectric fiber disposed between said electrode plates so as to be in parallel with the direction of the electric field created by said electrode plates and the flow of liquid spurted from said conduit, thereby defining a particle precipitation space between said conduit and the bottom of said tank;

a liquid supply pipe communicating with said liquid conduit;

a liquid outlet pipe for removing the treated liquid from the upper part of said tank to the exterior; and

a drainage pipe for discharging the liquid remaining in said particle precipitation space.

4,052,290

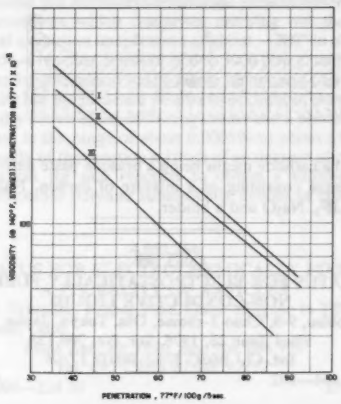
ASPHALT COMPOSITIONS

Donald R. Cushman, Wenonah; Charles A. Pagen, Woodbury; John W. Schick, Cherry Hill, all of N.J., and Tsoung-Yuan Yan, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed July 26, 1976, Ser. No. 708,803
Int. Cl.[2] C10G *3/00*
U.S. Cl. 208—6 7 Claims

1. A process for upgrading asphalt which consists essentially of admixing and forming a homogeneous blend of coal-derived asphaltenes with a marginal asphalt which has a potential

air-blown viscosity-penetration index lower than about 2.5 × 10^5, and air blowing the homogeneous blend to yield an asphalt



composition having a viscosity-penetration index higher than about 2.5 × 10^5.

4,052,291

PRODUCTION OF ASPHALT CEMENT

Wilton F. Espenscheid, Princeton, N.J., and Tsoung-Yuan Yan, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,877
Int. Cl.² C10G *1/04*
U.S. Cl. 208—8 **2 Claims**

1. A process for producing asphalt cement which comprises (1) forming a slurry by admixing solvent-refined coal with a fluidized catalytic cracking main column bottoms petroleum solvent in admixture quantities between about 1.0 and 5 parts by weight of petroleum solvent per part by weight of solent-refined coal, wherein said petroleum solvent has a hydrogen content distribution in which the H_{ar} proton content is between about 30 and 50 percent, the H_α proton content is at least about 30 percent, and the H_α/H_β proton ratio is above about 1.4; and (2) heating said slurry at a temperature between about 350+ F and 850° F for a period of time between about 0.2 and 2 hours to convert the slurry into a homogeneous composition which has a flowable asphaltic consistency at standard temperature.

4,052,292

LIQUEFACTION OF SOLID CARBONACEOUS MATERIALS

Wilton F. Espenscheid, Princeton, N.J., and Tsoung-Yuan Yan, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,220
Int. Cl.² C10G *1/04*
U.S. Cl. 208—8 **9 Claims**

1. A process for liquefaction of solid carbonaceous materials which comprises forming a slurry by admixing comminuted wood with a petroleum solvent selected from thermally stable petroleum refinery FCC main column bottoms and TCC syntower bottoms having a boiling point between about 450° F and 1100° F, and heating said slurry at a temperature in the range between about 350° F and 850° F for a period of time sufficient to convert the slurry into a homogeneous composition which has a flowable pitch-like consistency at standard temperature.

5. A process for liquefaction of solid carbonaceous materials which comprises forming a slurry by admixing comminuted wood and coal with a petroleum solvent selected from thermally stable petroleum refinery FCC main column bottoms and TCC syntower bottoms having a boiling point between about 450° F and 1100° F, and heating said slurry at a temperature in the range between about 350° F and 850° F for a period of time sufficient to convert the slurry into a homogeneous composition which has a flowable pitch-like consistency at standard temperature.

4,052,293

METHOD AND APPARATUS FOR EXTRACTING OIL FROM HYDROCARBONACEOUS SOLID MATERIAL

James L. Mercer, Los Altos, and Hachiro J. Togashi, Palo Alto, both of Calif., assignors to CRYO-MAID Inc., Del.

Filed Oct. 10, 1975, Ser. No. 621,474
Int. Cl.² C10G *1/02*
U.S. Cl. 208—11 R **9 Claims**

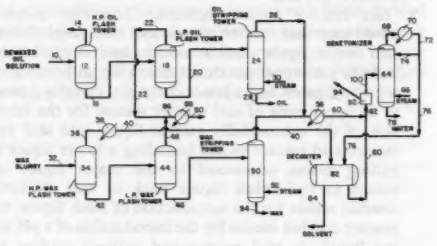
1. In a method for extracting oil and other hydrocarbons from oil shale, tar sand, coal, lignite and like hydrocarbonaceous solid material, the steps of advancing discrete individual pieces of said hydrocarbonaceous solid material along a pathway in a substantially evacuated system at a pressure no more than about 50 torr, said substantially evacuated system being in communication with at least one condenser surface, supplying heat energy to said pieces of hydrocarbonaceous material to raise the temperature thereof to within the range from about 600° to no more than 900° F. to cause the oil and other hydrocarbons therein to be liberated as a vapor in said evacuated system, and thereafter selectively condensing and recovering the oil from said vapor.

4,052,294

METHOD OF SOLVENT RECOVERY IN AUTOREFRIGERANT/KETONE DEWAXING PROCESSES

John H. Blume, Chester, and James D. Bushnell, Berkeley Heights, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Oct. 31, 1975, Ser. No. 627,711
Int. Cl.² C10G *43/08*
U.S. Cl. 208—33 **12 Claims**



1. In a dewaxing process comprising contacting a waxy oil with a dewaxing solvent comprising a mixture of a ketone wax antisolvent and an autorefrigerant to produce a dewaxed oil and wax slurry containing said solvents, separating said wax from said oil and wherein at least a portion of said solvents are recovered from the wax and dewaxed oil by a method which introduces excess water into said recovered solvents, the improvement which comprises removing the excess water from the recovered solvents by passing at least a major portion thereof to directly to a deketonizing zone to produce substantially ketone-free water and wet ketone with at least a portion of said wet ketone being passed diretly to a decanting zone in which is maintained a liquid layer of said autorefrigerant containing said ketone and minor amounts of water and in which is also maintained a liquid layer of wet ketone and continuously recycling said wet ketone layer back to said deketonizing zone and continuously removing autorefrigerant from the decanting zone.

4,052,295

PROCESS FOR THE DESULFURIZATION OF HYDROCARBON OILS WITH WATER VAPOR ADDITION TO THE REACTION ZONE

Karel M. A. Pronk, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 9, 1976, Ser. No. 656,544

Claims priority, application Netherlands, Mar. 24, 1975, 7503466

Int. Cl.² C10G *23/02*

U.S. Cl. 208—211 10 Claims

1. A continuous process for the catalytic hydrodesulfurization of vanadium-containing heavy hydrocarbon oils which comprises (a) contacting in a reaction zone vanadium-containing heavy hydrocarbon oil at elevated temperature and pressure with hydrogen and with a catalyst which contains from about 0.5 to 20 parts by weight of nickel and/or cobalt and from about 2.5 to 60 parts by weight of molybdenum and/or tungsten per 100 parts by weight of a porous carrier selected from the group consisting of alumina, silica, magnesia, zirconia and mixtures thereof and in the absence of added water vapor until the average vanadium content of the catalyst has increased during said contacting by at least 5 parts by weight per 100 parts by weight of said catalyst and (b) adding and maintaining a quantity of water vapor to the reaction zone after said vanadium content of said catalyst has increased during said contacting by at least 5 parts by weight per 100 parts by weight of said catalyst, said quantity of water corresponding to a water vapor partial pressure in the range from 0.5 to 30 bar during the process.

4,052,296

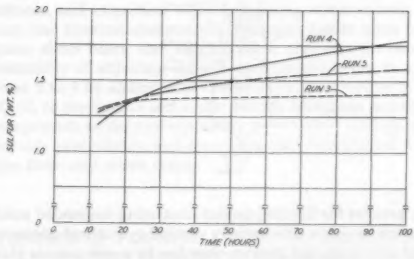
HYDROGENATION PROCESS EMPLOYING A ZINC PROMOTED CATALYST

Angelo Anthony Montagna, Monroeville, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 29, 1976, Ser. No. 745,635

Int. Cl.² C10G *23/02*

U.S. Cl. 208—216 8 Claims



1. A process which comprises contacting a hydrocarbon feed selected from the group consisting of naphtha and heavier liquid hydrocarbons with a catalyst in a hydrogenation zone under hydrogenation conditions to separate sulfur and nitrogen from said hydrocarbon feed, said catalyst consisting essentially of a Group VI-B metal, nickel and zinc supported on alumina or a silica-stabilized alumina, the Group VI-B metal and nickel being in the sulfided form, and recovering a hydrogenated hydrocarbon product from said hydrogenation zone.

4,052,297

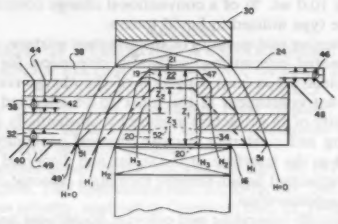
MATERIALS HANDLING APPARATUS FOR A FERROFLUID SINK/FLOAT SEPARATOR

Leon Mir, Brookline, Mass., assignor to Avco Corporation, Wilmington, Mass.

Filed May 30, 1973, Ser. No. 365,066

Int. Cl.² B03B *13/04*

U.S. Cl. 209—1 7 Claims



1. A ferrofluid sink/float separator with access means into and out of the ferrofluid comprising:

a. means for supplying a magnetic field capable of supporting an unconstrained column of ferrofluid within the magnetic field, said magnetic field further having defined therein a predetermined volume of space, the top of said volume is positioned in the magnetic field above where the top of the unconstrained column would occur, and

b. a partially closed container defined by a bottom closure and side walls containing ferrofluid filling said predetermined volume of space and further containing ferrofluid-air interfaces, the location of which are defined by the relationship:

$$Z = \frac{1}{\rho g} \int_{H_{z(lower)}}^{H_{z(upper)}} M\,dH$$

where:

$H_{z(lower)}$	=	the magnetic field intensity at the lower edge of the ferrofluid-air interface,
$H_{z(upper)}$	=	the magnetic field intensity at the top surface of the ferrofluid
M	=	the ferrofluid magnetization,
dH	=	the incremental change of the magnetic field intensity within the ferrofluid,
ρ	=	the density of the ferrofluid,
g	=	acceleration of gravity, and
Z	=	the vertical distance of any point on the interface below the top surface of the ferrofluid.

c. an access opening in a side wall to expose an interface, the marginal edge of the access opening being no closer to the column of ferrofluid than intercepting the interface.

4,052,298

TREATMENT OF ELECTROPHOTOGRAPHIC TONER COMPOSITIONS

Edward T. Bradley, Caledonia, Wis., assignor to Colorkrome, Inc., Traverse City, Mich.

Filed Nov. 26, 1974, Ser. No. 527,485

Int. Cl.² B03B *1/00;* B03D *3/06*

U.S. Cl. 209—5 15 Claims

1. Method for separating mineral spirit solvent vehicle constituents from charge-responsive colorant constituents in electrophotographic quality, normally liquid hydrocarbon mineral spirit-based toner compositions containing said charge responsive colorant constituents, which are resin binder coated colorant materials, dispersed in the solvent vehicle, said charge response colorant constituents being responsive to attraction by electrical charge so as to deposit on a sensitized and exposed

latent image retaining electroconductive base material whereby the image is fixed and developed in the base, which method comprises the steps of:

i. uniformly dispersing said toner in water to form a dispersion;

ii. introducing generally onto the surface of said dispersion, without substantial physical intermixing, a quantity of an extractant mixture comprising a normally liquid hydrocarbon mineral spirit which contains between about 1.0 to about 10.0 wt. % of a conventional charge control agent of the type utilized in liquid toners;

iii. contacting said quantity of an extractant mixture, without substantial intermixing, with said dispersion for a time sufficient for at least a portion of the charge-responsive colorant constituent in the toner to be attracted to said quantity of an extractant mixture by substantially agglomerating and clustering in close physical proximity thereabout at the interface of the water and dispersed solvent and extractant liquid, thereby forming a colorant constituent agglomeration;

iv. physically separating said colorant constituent agglomeration and extractant mixture associated therewith from that which remains of said dispersion.

4,052,299

APPARATUS FOR WASHING IMPURITIES OUT OF GRANULAR MATERIAL

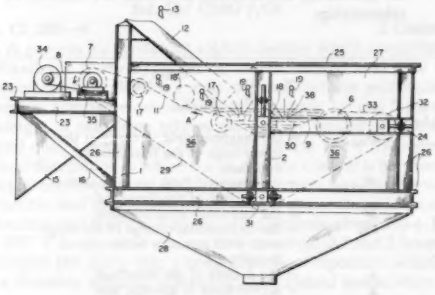
Wolfgang Rohr, Altriper Str. 115, Waldsee, Germany (D-6701)

Filed Dec. 29, 1975, Ser. No. 644,637

Claims priority, application Germany, Sept. 26, 1975, 2542940

Int. Cl.² B03B *5/08*

U.S. Cl. 209—430 **3 Claims**



1. An apparatus for washing out organic and loamy impurities from a solid granular material continuously conveyed through a wash zone, the granular material being heavier than the impurities, comprising the combination of

a. liquid spray means arranged in the wash zone for spraying wash liquid on the material and forming a mixture of the wash liquid and the material,

b. a chute in the wash zone for continuously delivering the solid granular material in a first direction,

c. a plane endless conveyor band entrained in a direction opposite to the first direction, the conveyor band having two lateral edges,

d. a set of rollers over which the endless conveyor band is trained, the set of rollers including

1. a first pair of rollers cooperating to define an upper and a lower course of the conveyor band, at least one of the rollers of the first pair being a drive roller for entraining the conveyor band in the opposite direction,

2. a second pair of rollers arranged in vertical alignment and between the rollers of the first pair, a lower one of the rollers of the second pair guiding the lower course of the conveyor band and an upper one of the rollers of the second pair being vertically adjustably mounted, the upper roller being arranged to depress the upper course of the conveyor band and to form a basin in the wash zone, the chute being arranged to deliver the solid granular material continuously to the basin, the upper roller consisting of a series of spaced apart disc-like elements and dividing the upper course of the conveyor band into an ascending downstream portion extending underneath the chute and an upstream portion, one roller of the first pair guiding the ascending portion of the conveyor band underneath the chute being vertically adjustably mounted, the heavier solid granular material forming a sediment in the basin and the ascending downstream portion of the conveyor band conveying the sediment towards the one roller of the first pair, and the lighter organic and loamy impurities forming a sludge with the wash liquid, the sludge floating above the sediment, and

3. a guide and support roller for the upstream portion of the conveyor band, the guide and support roller dividing the upstream conveyor band portion into an ascending part forming part of the basin and a contiguous substantially horizontal part extending from the guide and support roller towards the other roller of the first pair, the floating sludge flowing along the ascending and horizontal parts of the upstream conveyor band portion towards the other roller of the first pair,

e. a housing for the conveyor band, the housing including

1. side walls closely adjacent the lateral edge of the plane conveyor band,

2. a hopper below the conveyor band,

3. a passageway adjacent the other roller of the first pair to permit overflowing sludge to pass into the hopper by gravity, and

4. a vertical support for the lower and upper rollers, and

f. a discharge chute for the solid granular material arranged underneath the one roller of the first pair to receive the solid granular material by gravity.

4,052,300

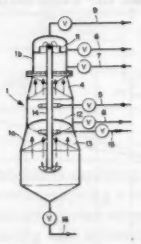
PROCESS AND DEVICE FOR THE FILTRATION OF LIQUIDS POLLUTED BY SUSPENDED SOLID BODIES

Franco Achille Mosso, Monza (Milan), Italy, assignor to Italba, S.p.A., Milan, Italy

Continuation of Ser. No. 527,596, Nov. 27, 1974, abandoned. This application May 26, 1976, Ser. No. 690,133

Int. Cl.² B01D *23/24*

U.S. Cl. 210—20 **5 Claims**



5. A process for filtering liquids containing suspended solids in a device having a substantially vertical cylindrical container divided into a top and bottom chamber by a non-porous plate member arranged in a fixed and immovable position transversely of said container, at least the top chamber further divided into an upper and lower section by a porous plate member arranged in a fixed and immovable position transversely of said top chamber, at least the upper portion of the side walls of the said lower section formed into a truncated cone shaped portion along its verticle axis with the smaller diameter end of said truncated cone shaped portion arranged adjacent the said porous fixed plate member, a first filter bed located in said lower section of said top chamber and a second

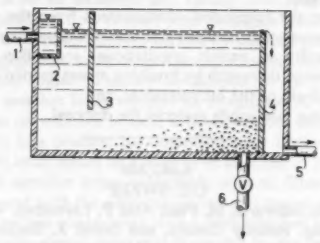
filter bed separately located in said bottom chamber, the process comprising passing the said liquid in an upwardly direction through said first filter bed at a velocity sufficient to compact the filter material into a bed or pack disposed within and occupying said truncated cone shaped chamber, said filter material formed of particles having a specific gravity no greater than the said liquid being filtered, the top smaller diameter end of said truncated cone shaped chamber being permeable to the passage of liquid there through but not to the filter material, passing the effluent in series flow from said first filter bed through fluid conduit means positioned internally of said cylindrical container and passing directly through said nonporous plate member to the other chamber and through the second filter bed contained therein and removing the effluent from said second filter bed as twice filtered liquid, thereafter backwashing each of said filter beds by flowing backwashing liquid in a direction opposite to the direction employed in the filtration step and at a flow rate sufficient to cause the temporary expansion of said first filter bed to result in the separation and removal of filtered solids.

4,052,301

PROCESS FOR PURIFYING WASTE WATER

Rainer Klein, and Jurgen Helberg, both of Kelkheim, Taunus, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 15, 1975, Ser. No. 596,162
Claims priority, application Germany, July 17, 1974, 2434293
Int. Cl.² C02B *1/20*
U.S. Cl. 210—51 **3 Claims**



1. A process for the simultaneous precipitation and removal of aluminum and titanium from extraction waste water obtained by water-alcohol extraction and separation of aluminum titanium halide olefin polymerization catalyst from an olefin polymerization reaction carried out in an inert hydrocarbon solvent, said extraction water containing water soluble aluminum and titanium compounds, hydrogen halide acids or inorganic alkali bases, and alkali halides, said process consisting essentially of adjusting the pH of the waste water to a pH of from 5 to 9 by adding acid or base, at a temperature of 40° to 80° C, to precipitate said water soluble aluminum and titanium compounds as the corresponding hydroxides, settling the hydroxide precipitates, and separating said precipitated hydroxides from said waste water.

4,052,302

PROCESS OF FORMING CATALYTIC SURFACES FOR WET OXIDATION REACTIONS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, Robert B. Jagow, San Jose, Calif.

Filed May 10, 1976, Ser. No. 685,027
Int. Cl.² C02C *5/04*
U.S. Cl. 210—63 R **12 Claims**

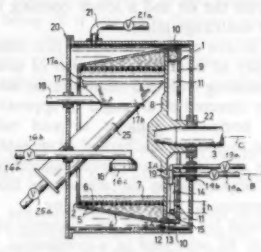
1. A method of forming catalytic surfaces comprising dissolving a soluble ruthenium salt in a liquid medium, introducing said liquid medium containing the dissolved salt into a reaction vessel having internal surfaces of metallic material, maintaining the operating temperature within said reaction vessel at a temperature such that ruthenium black is deposited on the internal surfaces of said vessel, said ruthenium salt being present in said liquid medium in an amount sufficient to provide a catalytically active amount of ruthenium black on said surfaces of said reaction vessel.

4,052,303

METHOD OF OPERATING A CENTRIFUGAL FILTER AND A FILTER CENTRIFUGE OPERATING ACCORDING TO THIS METHOD

Günther Hultsch; Kurt Zeppenfeld; Peter Niedner, and Peter Ostermeyer, all of Munich, Germany, assignors to Krauss-Maffei AG, Munich, Germany

Continuation-in-part of Ser. No. 423,579, Dec. 10, 1973, Pat. No. 3,943,056. This application Feb. 27, 1976, Ser. No. 662,163
Claims priority, application Germany, Dec. 11, 1972, 2260461; June 19, 1973, 2331202
The portion of the term of this patent subsequent to Aug. 27, 1992, has been disclaimed.
Int. Cl.² B01D *33/02*; B04B *3/00*
U.S. Cl. 210—78 **8 Claims**



1. A filter centrifuge comprising:
a perforated drum rotatable about an axis;
means forming an annular chamber around said drum and rotatable therewith;
pump means for evacuating said chamber to withdraw air therefrom;
means for rotating said drum about said axis to displace said liquid phase through said filter cake; and
means for forming a continuum consisting of liquid which radiates outwardly through said drum; said drum being adapted to form a filter cake through which a liquid phase can pass outwardly into said chamber with a hydrostatic pressure determined by the rate at which liquid of said continuum is withdrawn from said chamber.

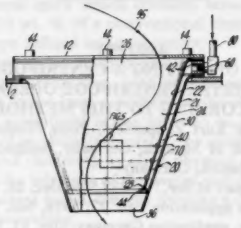
7. A method of operating a filter centrifuge comprising a perforated drum rotatable about an axis and formed with a filter medium upon which a filter cake can form during filtration, said drum being surrounded by a liquid-collecting compartment rotating together with said drum and having at least one outlet radially outwardly of said filter medium, said method comprising the steps of:
rotating said drum about said axis at a rate sufficient to induce passage of a liquid phase of a suspension outwardly through said filter medium into said liquid-collecting compartment;
initially forming a liquid suction-pressure head within said liquid-collecting compartment;
withdrawing air from said liquid-collecting compartment; and
maintaining the liquid suction-pressure head so as to produce a continuum consisting of liquid, which radiates outwardly through said drum, resulting from said rotating.

4,052,304

PREHEATING DEVICE FOR CENTRIFUGAL

Mathieu J. Vertenstein, Denver, Colo., assignor to CF&I Engineers, Inc., Denver, Colo.

Filed July 21, 1976, Ser. No. 707,154
Int. Cl.[2] B04B *3/00*; B01D *33/02*
U.S. Cl. 210—78 **17 Claims**



8. An air and suspension warming device for location above the basket of a rotating basket centrifuge for the downward flow through said device of massecuite, said device comprising:

a. a first tubular member having an upper opening communicating with the air and a lower opening communicating with the centrifuge inlet;

b. a steam source connected to said first tubular member;

c. a plurality of nozzles in the wall of said first member communicating with said steam source, said nozzles being inwardly directed at an angle of approximately 15°–20° from a horizontal tangent to said tubular member, whereby the steam discharged from said nozzles mixes with the air without substantial quantities of said steam directly impinging on the massecuite flowing from the upper opening to the lower opening.

15. A method for reducing the viscosity of heat sensitive suspensions to be separated in a continuous rotating basket centrifuge comprising the steps of:

a. Passing the suspension downwardly through a first tubular member;

b. Introducing steam into the member through nozzles on the wall of the first tubular member, the angle between the nozzles and a horizontal tangent to the first tubular member ranging between approximately 15°–20° to thereby form a vortex with the air in the member such that the steam does not directly impinge on the suspension.

4,052,305

METHOD AND APPARATUS FOR CLARIFYING LIQUIDS BY STRAINING

Kostas Savas Arvanitakis, 14945 S. Dogwood, Orland Park, Ill. 60462

Filed Sept. 30, 1975, Ser. No. 618,139
Int. Cl.[2] B01D *23/24, 27/12, 29/38, 35/22*
U.S. Cl. 210—79 **6 Claims**

1. A liquid solid separation microstrainer apparatus for removing suspended solids material from a contaminated liquid passed into the apparatus comprising a rotatable drum

straining means for separating solid material from a liquid, passing the liquid therethrough and retaining the solids material on the surface thereof,

said straining means positioned adjacent to the inlet for contaminated liquid and extending downwardly therefrom to a lowermost point and then upwardly to a discharge position above said lowermost point,

brushing means carried by said rotatable drum for conveying the solids materials from the surface of said straining means positioned adjacent the surface thereof and in engagement therewith,

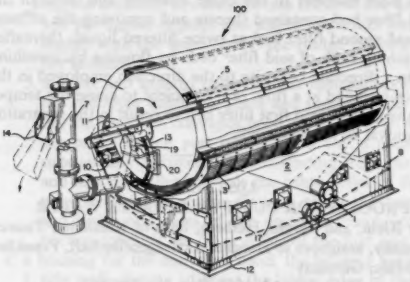
conveyor means for removing and draining solids material passed thereto positioned adjacent the discharge position of said strainer means to receive solids material conveyed thereto by said brushing means,

said conveyor means positioned to forward solids material passed thereto and to drain liquid therefrom, and

means for discharging solids material from said conveyor means.

5. The method of liquid/solid separation in a microstrainer comprising

passing contaminated liquid bearing suspended solids material therein over a separating medium,



gravitationally straining contaminated liquid through teh separating medium removing the suspended solids material therefrom and passing the clarified liquid therethrough,

brushing the suspended contaminants from the surface of said separating medium and conveying sad contaminants upwardly to permit gravitational separation of liquid contained therewith by brushing means carried by a rotatable drum of the microstrainer, and

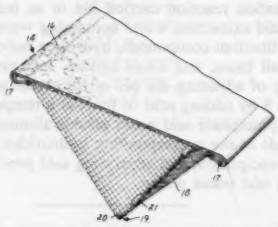
conveying said solids material for disposal.

4,052,306

OIL SWEEP

Michael G. Schwartz, St. Paul; Alan P. Lorentzen, White Bear Township, Ramsey County, and David J. Bucheck, N. St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 12, 1976, Ser. No. 731,464
Int. Cl.[2] E02B *15/04*
U.S. Cl. 210—242 S **7 Claims**



1. A floatable oil sweep useful in controlling oil spills on moving bodies of water comprising an elongated web of oil sorbent adapted to float on a body of water with its large-area faces parallel to the waterline, said web being reinforced along its edges with ropes that extend along the length of the web; an open-mesh netting disposed over one large-area face of the oil sorbent, with first and second longitudinal edges of the netting attached to corresponding first and second edges of the web; and weight means attached to the netting at points intermediate the edges of the web and extending along the length of the sweep such that when the web is horizontal a chamber en-

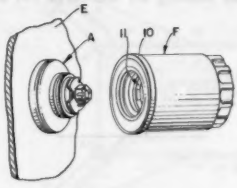
closed by the netting is formed below the lower face of the web, with the weight means hanging freely below the web a distance equal to at least 15 percent of the transverse width of the web; said oil sweep being windable into a compact storage roll in which the web is wound in tightly overlaid convolutions with netting sandwiched between the convolutions.

4,052,307

UNIVERSAL FILTER MOUNTING ATTACHMENT

Kingsley E. Humbert, Jr., Gastonia, N.C., assignor to Wix Corporation, Gastonia, N.C.

Filed July 8, 1976, Ser. No. 703,370
Int. Cl.[2] B01D *27/10*
U.S. Cl. 210—130 **13 Claims**



1. A universal filter mounting adaptor for internal combustion engines, comprises: a base plate having first seal means thereon for sealing engagement with an engine on which the adaptor is to be mounted and having first aperture means therethrough for flow of fluid from an engine and through the adaptor; a coupling member carried by the base plate for coupling engagement with complementary means on an internal combustion engine to secure the adaptor to the engine, said coupling member being selected for attachment to the particular engine on which it is used; a latch member carried by the base plate in a position for complementary latching engagement with latch means on a filter to be attached to the adaptor, said latch member being cooperable with all filters manufactured for use with the adaptor; second seal means on the base plate for sealing cooperation with a filter attached to the adaptor; normally closed valve means carried by the base plate to prevent loss of fluid from the engine through the first aperture means, said valve means being openable by fluid pressure developed in an engine to which the adaptor is attached; and said coupling member extending through the base plate and having means thereon for holding the base plate, latch and valve means assembled together for attachment as a unit to an engine.

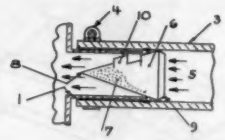
6. In combination, an oil filter adaptor means having coupling means thereon for cooperation with conventional filter attaching structure on an engine to attach the adaptor means to the engine, latch means on the adaptor means for latching engagement with complementary latch means on a filter manufactured for use therewith, and a filter having complementary latch means thereon engaged with the latch means on the adaptor means, releasably latching the filter to the adaptor means and thereby releasably latching the filter to the engine, said adaptor means having first apertures therethrough for flow of oil from the engine through the adaptor means to the filter for filtration of the oil, first valve closure means biased toward closing relationship with the first apertures, said first valve closure means being moved toward open position by oil pressure developed in the engine, valve means in the filter, biasing means in the filter biasing the valve means toward closed position when the filter is removed from the adaptor means to prevent spillage of oil from the filter, and valve actuating means on the adaptor means engageable with the valve means in the filter to open the valve means when the filter is latched to the adaptor means to enable flow of oil through the filter.

4,052,308

CONTAMINATION ENTRAPMENT AND CLEANING DEVICE FOR MOTOR VEHICLE ENGINE LIQUID COOLING SYSTEM COOLANT

Edward Wilford Higgs, 124 S. 250 E., N. Salt Lake, Utah 84054

Filed Aug. 25, 1975, Ser. No. 607,729
Int. Cl.[2] B01D *29/42*
U.S. Cl. 210—167 **1 Claim**



1. A filtering device installed in the radiator inlet of an internal combustion engine cooling system comprising a self supporting, hollow, conical, one piece metal wire cloth filter means which has its longitudinal axis disposed parallel to the coolant duct and having an integral bypass consisting of an opening in the uppermost portion of said conical filter means said opening being of a size such that any particle passing through an open thermostat will be captured or bypassed without reducing coolant flow rate in either event even when the filtering surface becomes clogged in normal operation.

4,052,309

PROCESS OF ELECTRODEPOSITION OF COATING COMPOSITIONS CONTAINING AN AMMONIA COMPLEX

Franz Holzer, and Gerhard Schmolzer, both of Graz, Austria, assignors to Vianova Kunstharz, A.G., Vienna, Austria

Continuation of Ser. No. 303,400, Nov. 3, 1972. This application Jan. 15, 1975, Ser. No. 541,122
Claims priority, application Austria, Nov. 8, 1971, 9589/71
Int. Cl.[2] C25D *13/10*
U.S. Cl. 204—181 **7 Claims**

1. The method of coating a substrate by electrodeposition comprising (1) providing a paint formulation comprising (A) at least one water-soluble binding agent which can be deposited anodically under the action of applied current, and (B) in an amount sufficient to increase the throwing power of said paint formulation a partially soluble ammonia complex of a salt of a metal of the group consisting of zinc, cadmium, copper, silver, nickel, and cobalt which is capable of forming an ammoniacate; and (2) forming an electrical circuit comprising an anode and cathode with said anode eing said substrate being coated and said substrate being in contact with said paint formulation of (1) while an electrodeposition current is applied to said substrate, the throwing power of said paint being increased due to the presence of said ammonia complex.

4,052,310

SEAL ASSEMBLY

John J. Nolan, Cambridge, Mass., assignor to Sala Magnetics, Inc., Cambridge, Mass.

Filed Sept. 27, 1976, Ser. No. 726,577
Int. Cl.[2] B01D *35/06*
U.S. Cl. 210—222 **10 Claims**

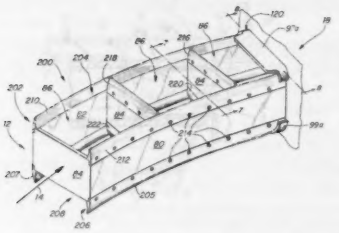
1. In a moving matrix magnetic separator in which a multi-compartment matrix moves through at least one processing station-

a matrix device with a pair of spaced apart, longitudinal edges and at least one transverse edge extending between them;

a resilient, transverse seal at said transverse edge of said

device arranged transversely of the direction of relative motion between the processing station and said device, said transverse seal extending a distance beyond said device greater than the distance between a surface of said station and said device, and constructed and arranged to be bent rearwardly from a direction of motion to firmly, sealingly engage the surface; and

a resilient, longitudinal seal at each said longitudinal edge of



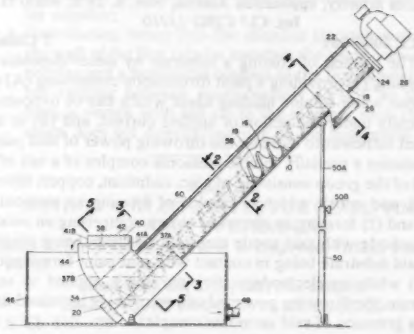
said device arranged generally longitudinally to the direction of relative motion between the surface and said device; each said longitudinal seal extending a distance beyond said device greater than the distance between a surface of said station and said device for enabling each said longitudinal seal to be bent inwardly of said device, and firmly, sealingly engage said surface, and being constructed and arranged to sealingly engage opposite ends of said transverse seal when bent inwardly.

4,052,311

APPARATUS FOR SEPARATING SOLIDS FROM LIQUIDS

William F. Martin, Tulsa, Okla., assignor to James A. Herring, Tulsa, Okla., a part interest

Filed Jan. 19, 1976, Ser. No. 650,039
Int. Cl.[2] B01D *35/06, 21/24*
U.S. Cl. 210—223 **10 Claims**



1. An apparatus for separating solids from liquids, such as metal cuttings from machine coolant, comprising:

an upwardly inclined elongated housing having a solids discharge chute adjacent the upper end and an inlet opening adjacent the bottom;

a helix rotatably positioned in said housing extending from the housing inlet and upwardly at least to said solids discharge chute;

an upwardly extending liquid outlet chamber having an inwardly inclined open bottom connecting with said housing inlet opening adjacent and above said helix, the open top of the outlet chamber forming an overflow weir;

an upwardly extending inlet chamber having an inwardly inclined open bottom adjacent and above said helix, the inlet chamber being supported within said outlet chamber and providing fluid passageways between the inlet chamber bottom and the interior of the outlet chamber, whereby fluid received in said inlet chamber flows out the inlet chamber bottom and at least partially into the lower portion of said housing and upwardly through said fluid passageways to the upper portion of said outlet chamber, the upper end of the outlet chamber being lower than the upper end of the inlet chamber whereby liquid passes out by flowing over the outlet chamber upper overflow weir, solids passing downwardly from said inlet chamber into said housing inlet opening, the inlet chamber and outlet chambers forming a quiescent fluid reservoir from which solids are permitted to settle into said housing and the lower portion of said helix; and

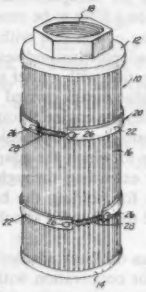
means of rotating said helix to move separated solids upwardly in said housing for discharge out said discharge chute.

4,052,312

STRAINER MAGNETS

Charles King, Belleville, Mich., assignor to Flow Ezy Filters, Inc., Ann Arbor, Mich.

Continuation-in-part of Ser. No. 299,953, Oct. 13, 1972, abandoned. This application Nov. 16, 1973, Ser. No. 416,596
Int. Cl.[2] B01D *35/06*
U.S. Cl. 210—223 **1 Claim**



1. A fluid filter assembly comprising:

an annular filter element adapted for insertion into a filter housing, said filter element being pleated and having an exterior surface constructed of nonmagnetizable material through which a fluid to be filtered flows into the interior of said filter element;

an annular band of magnet material, said magnet material being formed from a pliable, relatively nonresilient material to adapt itself to the exterior surface of filter elements of different diameters and having a plurality of magnet members embedded therein throughout its length to magnetically attract particles to it throughout its length; and

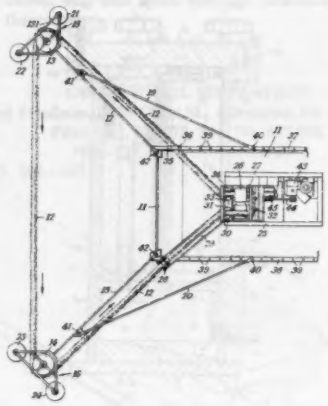
a spring member removably mounted to the ends of said band of pliable magnet material for fastening said ends together around the exterior surface of said filter element intermediate said filter element and the filter housing whereby in operation the band is in direct fluid contact with the fluid.

4,052,313

MATERIAL RECOVERY SYSTEMS

George Henry Rolls, Lymington, England, assignor to John Rolls, Dorset, England, a part interest

Filed Apr. 8, 1976, Ser. No. 674,756
Claims priority, application United Kingdom, Apr. 14, 1975, 15249/75
Int. Cl.² E02B *15/04*
U.S. Cl. 210—242 AS 6 Claims



1. In an oil recovery system, the combination of a marine craft arranged for movement on the surface of water contaminated by oil, oil extraction means mounted on said craft, a continuous loop of a rope of adsorbent material which is arranged for floating on the surface of the water in proximity to the craft, said rope preferentially adsorbing oil from the water and passing to said extraction means for extraction of oil therefrom, a rope guide float unit arranged for floating on the water and including rope guide means around which the rope is guided, and a float unit support structure comprising rigid strut means connected at one end direct to the float unit, pivotal mounting means pivotally mounting the other end of the strut means on the craft at a pivot position thereon to permit pitching movement of the float unit relative to the craft while maintaining the float unit at a predetermined distance from said pivot position, and restraining means preventing yaw movements of the float unit relative to the craft.

4,052,314

FILTER PLATE FOR A PLATE TYPE FILTER PRESS

Oswald Busse, and Hugo Klesper, both of Aarbergen, Germany, assignors to Passavant-Werke Michelbacher Hutte, Germany

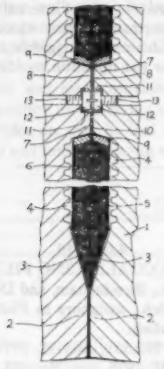
Filed June 28, 1976, Ser. No. 700,322
Claims priority, application Germany, June 28, 1975, 7520639
Int. Cl.² B01D *25/12*
U.S. Cl. 210—230 5 Claims

1. In a filter plate for a plate type filter press particularly adapted for use in the dewatering of sewage sludges wherein each filter plate of said filter press is adjacent another filter plate with each filter plate having a plate frame with filtrate discharge means covered by filter cloth disposed adjacent the bottom of a filter cake chamber formed by recesses in the filter plate, the improvement comprising:

a. at least one cam projecting from the bottom of said filter cake chamber of said filter plate in position to engage a corresponding cam on an adjacent filter plate and support its filter plate on said corresponding cam on an adjacent filter plate with said cam extending substantially to the level of the outer surface of the frame of its filter plate,

b. said filter cloth covering its plate frame and having an opening therein adapted to receive said cam,

c. a clamping ring surrounding said cam and the filter cloth adjacent thereto to provide a seal therebetween, and



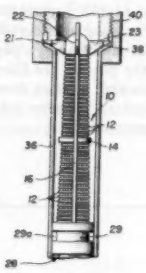
d. a washer-like member overlying and forming part of said cam and overlying a portion of said clamping ring and retaining said clamping ring in place.

4,052,315

ONE-PIECE MOLDED FILTER

Ernest Harold Lindsay, Jr., Joliet, and Richard Francis Daubert, Jr., Bridgeview, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Continuation of Ser. No. 516,781, Oct. 21, 1974, abandoned.
This application Mar. 1, 1976, Ser. No. 663,002
Int. Cl.² B01D *29/10*
U.S. Cl. 210—232 8 Claims



1. A one-piece injection molded plastic fluid filter including a base portion having a fluid passageway therethrough, a head portion spaced axially from said base a predetermined distance, a plurality of axially spaced apart annular rings positioned between said base portion and said head portion, each of said rings having a predetermined internal and external diameter, a plurality of arcuately spaced axially disposed ribs extending between said base and head portions and extending solely in a direction radially inwardly from an internal juncture of the radially outer edges of said ribs with the predetermined internal diameter of each of said rings, said ribs and said annular rings each projecting in radially opposite directions from said junctions and cooperating to provide a multiplicity of predetermined size filtration openings at said juncture between said spaced ribs and rings, said rings have a substantially uniform cross-section and are substantially uniformly spaced from each other and said ribs have inwardly converging side surfaces for providing said openings with a substantially uniform size and shape, and at least one axially disposed larger rib extending between said head and base portions and extending radially

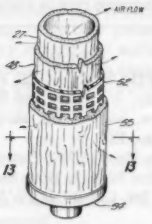
outwardly from said juncture, said larger rib having a greater circumferential thickness than the other said ribs integrally connecting each adjacent ring throughout the entire radial extent between said predetermined internal and external diameters for a limited portion of their circumferential extent, whereby said larger rib serves to rigidify said filter rings and serves as a conduit for the injection molded plastic to ensure completed rings.

4,052,316

COMPOSITE COALESCING FILTER TUBE

Leo Joseph Berger, Jr., Birmingham, and Denis D. Guequierre, Livonia, both of Mich., assignors to Finite Filter Company, Madison Heights, Mich.

Division of Ser. No. 593,831, July 17, 1975. This application Feb. 17, 1976, Ser. No. 658,222
Int. Cl.[2] B01D *29/14*
U.S. Cl. 210—315 **24 Claims**



1. A vacuum formed highly porous pre-filter support tube formed of randomly oriented glass fibers being bound together by a cured epoxy binder and having a perforated rigid retaining tube surrounding the porous pre-filter support layer, and being in intimate interlocking contact therewith at all points of contact along the boundary between said rigid support tube and said pre-filter support tube.

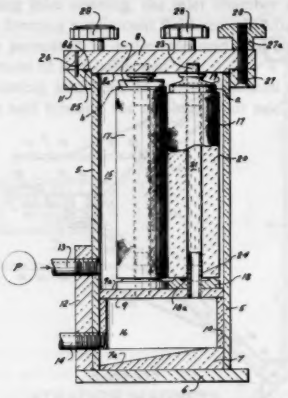
4,052,317

FILTERING EQUIPMENT

Karl Palnik, Huntingdon Valley, Pa., assignor to The Carolinch Company, Huntingdon Valley, Pa.

Filed Dec. 29, 1975, Ser. No. 644,663
Int. Cl.[2] B01D *23/00*
U.S. Cl. 210—323 T **10 Claims**

1. Filtering equipment for filtering fluid under pressure, adaptable for insertion and removal of at least one filter cartridge of the type which may vary in dimension, particularly length and end configuration, comprising a filter chamber, a flow passage, a rigid divider between said chamber and said passage including at least one discharge connection between said chamber and said passage, a removable rigid cover for said chamber spaced from said divider a predetermined distance with the cover fixedly mounted to close said chamber, at least one substantially cylindrical filter cartridge in the chamber having a central hollow and adapted to be removably positioned within said chamber, said hollow connected with said discharge connection to allow flow of said fluid from said chamber, through said cartridge, through said discharge connection to said flow passage, a first annular seat member and a second annular seat member associated respectively with the end portions of said cartridge and each substantially centered with respect to said central hollow of the cartridge, one seat member being secured between the cartridge and the divider and the other seat member being secured between the cartridge and the cover, the said filter cartridge and the said two seat members having a total axial dimension greater than the said predetermined distance between the rigid divider and the rigid cover when the cartridge and said two annular seat members



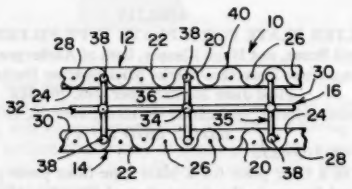
are uncompressed, and said first annular seat member comprising a resilient material substantially nonpermeable and impervious to attach by the fluid to be filtered and having an interior hollow cavity defined by a flexible wall, said flexible wall being deformable in the direction of the axis of the cartridge to such extent as to accommodate said filter cartridge and to permit the two seat members to seat and to seal the ends of the filter cartridge when the cartridge and said annular members are pressed between the cover and the rigid divider.

4,052,318

MESH COFFEE FILTER

Bonnie E. Krebs, No. 84 Countryside Village, Great Falls, Mont. 59404

Filed July 8, 1976, Ser. No. 703,429
Int. Cl.[2] B01D *25/02*
U.S. Cl. 210—337 **9 Claims**



1. A filter for use in a hot beverage making machine of the type where the hot beverage has grounds and fines which must be separated from the hot beverage comprising:

A. a fine mesh top filter,

B. a fine mesh bottom filter,

C. carrier means adapted to be positioned between said top and bottom filters and permit the hot beverages to pass therethrough,

D. securing means to provide said top and bottom filters in fixed relation to said carrier means across the complete area defined by said filters, so as to permit said filters to be

removed for cleaning or replacement when a force of predetermined magnitude is manually applied to overcome the frictional engagement between said securing means and said filters, and

E. said securing means includes:

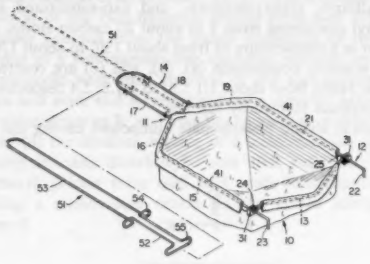
1. a plurality of hinges connected at one end thereof to said carrier means and extending on both sides thereof, and
2. locking members formed at the free end of each of said hinges and having an enlarged head portion adapted to extend into said mesh filters in interlocking relation therewith.

4,052,319

COOKING OIL FILTRATION

Bernard Friedman, 2730 Chew St., Allentown, Pa. 18104

Filed Nov. 3, 1975, Ser. No. 627,904
Int. Cl.² B01D *35/02, 23/20*
U.S. Cl. 210—465 **9 Claims**



1. A filter for cooking oil, comprising:

a filter support, said filter support being comprised of a first member having a first side portion, a second side portion opposite said first side portion, a first end portion and a handle portion extending from said first end portion, said first member being formed of a single first rod, and a second member in the form of a second rod extending between said first and second side portions to define a second end portion opposite to said first end portion, said second rod member including first and second hooked end portions said first hooked end portion being hooked around the first side portion of said first rod member and the second hooked portion being hooked around the second side portion of said first rod member; means for retaining the second member in position between said first and second side portions, said means for retaining the second rod member in position being comprised of first and second clips for receiving said hooked portions, said clips being removably secured to said first and second rod portions to prevent unhooking of said hooked portions from the first rod member; and

a filter bag, said filter bag being removably supported on said filter support, said filter bag including sleeve portions, said first and second members being inserted into said sleeve portions to thereby removably support said filter bag.

4,052,320

TELESCOPING SERUM SEPARATOR AND DISPENSER

Raymond F. Jakubowicz, Manchester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

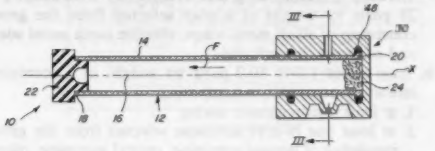
Continuation-in-part of Ser. No. 609,121, Aug. 29, 1975, abandoned. This application July 8, 1976, Ser. No. 703,476
Int. Cl.² B01D *21/26*
U.S. Cl. 210—516 **22 Claims**

1. A device comprising, in combination,

a blood serum separation compartment having wall means extending between two opposite ends one of which is open for serum flow,

and telescoped over said open end, a serum dispensing container comprising wall means including an end wall and side walls encompassing said compartment, said side walls including a dispensing aperture and a pressurizing aperture,

said compartment and said container being movable between a first position for receiving a sample in which said end wall provides an airtight seal against said compartment open end and said dispensing aperture being remov-



ably blocked from serum flow communication with said compartment by a portion of said wall means of said compartment and a second position for dispensing serum in which said open end is unblocked for flow of serum into said container and said dispensing aperture when said container end wall is moved away from said open end,

sealing means for providing an airtight seal between said compartment and said container when in said second position,

and a thixotropic gel phase separator disposed in sealing position within said compartment against said container end wall.

4,052,321

FLAME-RETARDANT YARN OR THREAD CONTAINING BROMINATED ESTER OF OLEIC OR LINOLEIC ACID

Jefferson Lyle Claiborne, Hexson, Tenn., assignor to Dixie Yarns, Inc., Chattanooga, Tenn.

Filed Mar. 17, 1976, Ser. No. 667,659
Int. Cl.² D06M *13/20*
U.S. Cl. 252—8.6 **16 Claims**

1. A flame-retardant yarn or thread, comprising a yarn or thread having applied thereto a flame-retardant lubricant which is a polybrominated ester selected from (1) compounds of the formula

$$R_1-\overset{\overset{O}{\|}}{C}-O-R_2$$

wherein

$$R_1-\overset{\overset{O}{\|}}{C}-O$$

is a dibrominated oleic or linoleic acid moiety and

R_2 is selected from the group consisting of unsubstituted, dibrominated, or tetrabrominated straight or branched chain saturated aliphatic groups having from 1 to about 20 carbon atoms;

$$H-(OR_3)_x-$$

wherein R_3 is an alkylene group having 2 to 3 carbon atoms and x is a number from 1 to about 25 and

glycerol sans a hydroxyl group;

2. hexabromo glycerol trioleate, (3) hexabromo sorbitan trioleate, (4) tetrabromo polyethylene glycol dioleate, (5) tetrabromo polyethylene glycol dioleate and (6) brominated lecithin.

4,052,322

CORROSION-INHIBITED GREASE COMPOSITIONS

Fred T. Crookshank, Port Arthur, Tex., assignor to Texaco Inc., New York, N.Y.

Filed June 24, 1976, Ser. No. 699,409
Int. Cl.[2] C10M 3/18
U.S. Cl. 252—18 **11 Claims**

1. A lubricating grease having superior anti-corrosive properties comprising a homogeneous admixture of the following components in their indicated range of proportions:

a. from about 75 to 96 parts by weight of oil of lubricating viscosity thickened to grease consistency with about 2 to 25 parts by weight of a soap selected from the group consisting of alkali metal soaps, alkaline earth metal soaps and mixtures thereof, and

b. from about 1.0 to 10.0 parts by weight of a corrosion-inhibiting composition comprising:

1. at least one inorganic nitrite,

2. at least one N-acyl sarcosine selected from the group consisting of lauroyl sarcosine, cocoyl sarcosine, oleoyl sarcosine, stearoyl sarcosine, fatty acid sarcosines containing from 8 to 22 carbon atoms per molecule and mixtures thereof, the weight ratio of sarcosine to nitrite varying from about 0.05 to 7.5 parts by weight of sarcosine to 0.075 to 7.5 parts of weight of nitrite.

4,052,323

HIGH-TEMPERATURE LUBRICANT FOR THE HOT-WORKING OF METALS

Kurt Feneberger, and Rolf Gely, both of Sins, Switzerland, assignors to Lonza, Ltd., Gampel, Valais, Switzerland

Filed Nov. 13, 1974, Ser. No. 523,499
Claims priority, application Switzerland, May 8, 1974, 006242/74; Sept. 6, 1974, 012127/74
Int. Cl.[2] C10M 3/18
U.S. Cl. 252—23 **31 Claims**

1. The high-temperature lubricant for the hot-working of metals which comprises (a) 10 to 90 percent by weight of graphite, (b) 2 to 45 percent by weight of an homopolymer or copolymer selected from the group consisting of polyethylene, poly(methyl methacrylate), polystyrene, poly(vinyl acetate), poly(vinyl laurate), poly(vinyl propionate), a copolymer of methyl methacrylate and styrene, a copolymer of methyl methacrylate and alpha-methyl-styrene, polyisobutylene, poly(dibutyl maleinate), poly(diallylphthalate), polypropylene, poly(-methyl acrylate), a copolymer of vinyl acetate and ethylene, polyisobutylene and mixtures thereof, and (c) 0.5 to 8 percent by weight of a dispersing agent which is selected from the group consisting of a polysaccharide, an alkyl cellulose and an alginate, said lubricant being solid at room temperature.

4,052,324

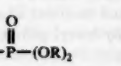
REACTION PRODUCT OF DIALKYL ALKANEPHOSPHONATE, SUBSTITUTED IMIDAZOLINE, AND WATER IN LUBRICANT COMPOSITIONS

Milton Braid, Westmont, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 4, 1976, Ser. No. 738,762
Int. Cl.[2] C10M 1/44, 3/38, 5/24, 7/24
U.S. Cl. 252—32.5 **19 Claims**

1. A lubricant composition which comprises: an oleaginous media; and an antiwear improving amount of the product formed by reacting:

a. a dialkyl alkane phosphonate compound having the formula



where R′ is a substantially unbranched paraffinic alkyl group containing from about 10 to about 36 carbon atoms and R is a hydrocarbyl group containing from 1 to about 4 carbon atoms with at least one hydrogen atom present on the carbon atom which is bonded to the oxygen;

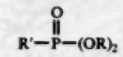
b. a substituted imidazoline of the formula:

where one of the R^2 and R^3 substituents must be a substantially unbranched paraffinic or olefinic hydrocarbyl group containing from about 12 to about 35 carbon atoms; and the other R^2 or R^3 substituent is selected from the group consisting of: paraffinic alkyl containing from 1 to about 35 carbon atoms, alkenyl containing from 1 to about 35 carbon atoms and hydroxy-, alkoxy-, alkoxymethoxy-, and oxo-substituted alkyl and alkenyl containing from 1 to about 20 carbon atoms; and

c. water at a temperature of from about 130° to about 170° C and wherein compounds (a), (b), and (c) are reacted in molar ratios from about 1:1 :.30 to 1:1.2: 2.4 respectively.

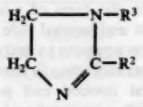
13. A product formed by reacting

a. a dialkyl alkane phosphonate compound having the formula



where R′ is a substantially unbranched paraffinic alkyl group containing from about 10 to about 36 carbon atoms and R is a hydrocarbyl group containing from 1 to about 4 carbon atoms with at least one hydrogen atom present on the carbon atom which is bonded to the oxygen;

b. substituted imidazoline of the formula:



where one of the R^2 and R^3 substituents must be a substantially unbranched paraffinic or olefinic hydrocarbyl group containing from about 12 to about 35 carbon atoms; and the other R^2 or R^3 substituents is selected from the group consisting of: paraffinic alkyl containing from 1 to about 35 carbon atoms, alkenyl containing from 1 to about 35 carbon atoms; and hydroxy-, alkoxy-, alkoxymethoxy-, and oxo-substituted alkyl and alkenyl containing from 1 to about 20 carbon atoms; and

c. water at a temperature of from about 130° to about 170° C and wherein compounds (a), (b), and (c) are reacted in molar ratios from about 1:1 :.30 to 1:1.2: 2.4 respectively.

4,052,325

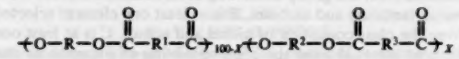
LIQUID ELECTROGRAPHIC DEVELOPER COMPOSITION CONTAINING REDISPERSIBLE POLYESTER TONER AND PROCESS

Domenic Santilli, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 535,618, Dec. 23, 1974, abandoned. This application June 28, 1976, Ser. No. 700,249
Int. Cl.[2] G03G 9/12
U.S. Cl. 252—62.1 L **10 Claims**

1. An electrographic liquid developer composition comprising a mixture of electrostatically-attractable, heat-fixable redis-

persible toner particles in an electrically insulating liquid carrier having a volume resistivity greater than 10^{10} ohm-cms. and a dielectric constant less than about 3.0, said toner particles (a) present in an amount of from about 0.05 to about 15 weight percent of said developer composition, (b) having a melting point in the range of from about 40° to about 150° C, and (c) comprising, in an amount greater than about 0.05 weight percent of said developer composition, a linear polyester physically inert with respect to said carrier liquid, said polyester having the formula



wherein X represents a mole percentage value within the range of 0 to 100 mole percent; R and R^2, which may be the same or different, represent a member of the group selected from the divalent residue of an aliphatic, alicyclic, or aromatic diol upon removal of the two hydroxy groups from said diol; R^1 is a member selected from the group consisting of the divalent residue of a sulfonamido-free aliphatic, alicyclic or aromatic dicarboxylic acid upon removal of the two carboxy groups from said acid; and R^3 represents (i) a member selected from the same group as R^1 and may be the same as or different from R^1 or (ii) the divalent residue of a disulfonamido group-containing aromatic dicarboxylic acid upon removal of the two carboxyl groups from said acid, said disulfonamido group having a monovalent cation on the amido nitrogen atom thereof.

4,052,326

MANUFACTURE OF γ-IRON(III) OXIDE

Eduard Schönafinger, Mannheim, and Bernd Leutner, Maxdorf, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Continuation-in-part of Ser. No. 514,095, Oct. 11, 1974, abandoned. This application Aug. 30, 1976, Ser. No. 718,690
Claims priority, application Germany, Oct. 19, 1973, 2352440
Int. Cl.² C01G *49/02*
U.S. Cl. 252—62.56 **4 Claims**

1. In a process for the manufacture of acicular γ-iron(III) oxide of improved crystallinity and high coercive force by heating goethite or acicular γ-iron(III) oxide at a temperature of from 500° to 800° C, reducing the resulting product to magnetite at a temperature of from 280° to 600° C and subsequently oxidizing the magnetite to γ-iron(III) oxide, the improvement which comprises adding heat to the magnetite in an inert gas atmosphere to maintain a temperature of from 400° to 600° C after the reduction step has been completed.

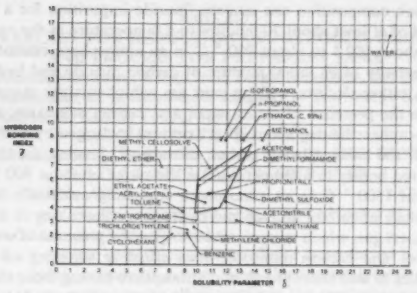
4,052,327

COMPOSITIONS FOR ERADICATING ELECTROPHOTOGRAPHIC IMAGES FROM TRANSLUCENT PAPER

Ronald D. Arena, Durham, and Eric G. Lowry, Middletown, both of Conn., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 431,391, Jan. 7, 1974, abandoned. This application July 28, 1975, Ser. No. 599,719
Int. Cl.² C11D *7/02, 3/16, 3/43*
U.S. Cl. 252—141 **4 Claims**

1. A composition for eradicating electrophotographic images from paper which comprises a solvent mixture, the Cartesian coordinates of which fall within the quadrangle bounded by the coordinates (9.8, 3.7), (10.0, 6.0) (13.7, 8.5) and (11.5, 4.0) on the Hydrogen Bonding Index (δ) versus Solubility Parameter (δ) plot of the drawing, said solvent mixture containing a nitrile having from 2 to 3 carbon atoms, and a solvent



selected from the group consisting of ketones and esters having up to 4 carbon atoms.

4,052,328

AZEOTROPE-LIKE COMPOSITIONS OF TRICHLOROTRIFLUOROETHANE, ETHANOL, ISOPROPANOL AND NITROMETHANE

Francis J. Figiel, Boonton, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 638,237, Dec. 8, 1975, abandoned. This application Nov. 16, 1976, Ser. No. 741,636
Int. Cl.² C11D *7/50, 7/32, 7/30*; C23G *5/02*
U.S. Cl. 252—171 **4 Claims**

1. Azeotrope-like compositions comprising about 94.8 weight percent 1,1,2-trichloro-1,2,2-trifluoroethane, about 2.4 weight percent ethanol, about 0.9 weight percent isopropanol and about 1.9 weight percent nitromethane.

4,052,329

METHOD OF PREPARING CERIUM-ACTIVATED YTTRIUM SILICATE PHOSPHOR

Yoji Fukuda; Fumio Fukushima, both of Neyagawa; Yoshinobu Tsujimoto, Kashiwara; Masakazu Fukai, Nishinomiya, and Shinji Sugai, Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation-in-part of Ser. No. 447,817, March 4, 1974, abandoned. This application June 7, 1976, Ser. No. 693,930
Claims priority, application Japan, Mar. 2, 1973, 48-24951; Aug. 28, 1973, 48-96822
Int. Cl.² C09K *11/46*
U.S. Cl. 252—301.4 F **3 Claims**

1. A method of increasing the emission intensity of a Y_2SiO_5:Ce phosphor at around the 450nm wavelength comprising adding BaF_2 to a mixture of Y_2O_3, SiO_2 and CeO_2,
wherein the BaF_2 is added in an amount such that the BaF_2/Y_2O_3 mol ratio is 0.01 to 0.2 inclusive and wherein the SiO_2/Y_2O_3 mol ratio is 1.0 to 1.2 inclusive,
and thereafter firing the BaF_2-containing mixture at a temperature of the order of 1200–1500° C in air or a reducing atmosphere of an inert gas containing up to 5% hydrogen to produce a cerium-activated phosphate phosphor exhibiting increased luminosity and emission intensity.

4,052,330

SINTERING URANIUM OXIDE USING A PREHEATING STEP

Neil John Jensen, Mountain View; Yogesh Nivas, San Jose, and Douglas Randall Packard, Sunol, all of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Mar. 20, 1975, Ser. No. 560,534
Int. Cl.² G21C *3/58*
U.S. Cl. 252—301.1 R **21 Claims**

1. A method for producing dense sintered bodies of a partic-

ulate composition comprising uranium oxide substantially free of fluoride ions comprising the steps of (1) preheating compacted bodies of the composition comprising uranium oxide, which composition can contain fluoride impurities, for a period of at least about 20 minutes to a temperature in the range of about 600 ° to about 900 ° C in an atmosphere consisting essentially of an initial mixture of carbon dioxide and hydrogen, either alone or with an inert gas, which mixture reacts to give the presence of water vapor and carbon monoxide, said atmosphere having about 30 ±2 percent hydrogen by volume with the balance being carbon dioxide, (2) heating the compacted bodies to a temperature in the range of about 900 ° to about 1500 ° C in an atmosphere consisting essentially of a mixture of carbon dioxide and hydrogen, either alone or with an inert gas, which mixture reacts to give the presence of water vapor and carbon monoxide thus effecting sintering of the bodies in said atmosphere, said atmosphere having from about 0.5 to about 90 percent hydrogen by volume with the balance being carbon dioxide, (3) thereafter holding the sintered bodies in a reducing atmosphere consisting essentially of a mixture of hydrogen and carbon dioxide to alter the ratio of oxygen to uranium atoms in the sintered uranium oxide to within the range of 1.98:1 to about 2.10:1, said atmosphere having from about 10 to about 90 percent hydrogen by volume with the balance being carbon dioxide, and (4) cooling the bodies in a protective atmosphere having an oxygen partial pressure in the range of about 10^{-4} to about 10^{-45} atmospheres of oxygen, said atmosphere being selected from the group consisting of dry hydrogen, wet hydrogen, dry carbon monoxide, wet carbon monoxide, inert gases, a mixture of hydrogen and carbon dioxide, and a mixture of any of the foregoing.

4,052,331

SURFACE ACTIVE COMPOSITION

Jean Dumoulin, Rhone, France, assignor to Rhone-Poulenc S.A., Paris, France

Division of Ser. No. 412,141, Nov. 2, 1973, Pat. No. 3,975,294. This application Apr. 13, 1976, Ser. No. 676,500

Claims priority, application France, Nov. 3, 1972, 72.38957

Int. Cl.² B01F *17/42;* B01J *13/00;* C08L *43/04*

U.S. Cl. 252—312 **13 Claims**

1. A process for preparing a transparent aqueous microemulsion or transparent gel in which a surface active composition and an organo-silicon compound are mixed together and the resulting mixture introduced into an aqueous medium wherein the surface active composition comprises by weight:

p1 a. 45 to 90% of at least one n-alkyl monoether of a polyethylene glycol, containing 4 to 9 $—CH_2CH_2O—$ units, the n-alkyl radicals containing 5 to 15 carbon atoms,

b. 5 to 35% of a sodium dialkylsulphosuccinate, the linear or branched alkyl radicals containing 6 to 12 carbon atoms,

c. 2 to 17% of at least one acid selected from the group consisting of oleic, linoleic, linolenic and ricinoleic acid, and

d. 1.5 to 12% of at least one amine selected from the group consisting of triethanolamine and N-hydroxyethylmorpholine,

and wherein the organosilicon compound is a monomer of the formula R_4Si or $R_3SiO_aSiR_3$ or an organopolysiloxane polymer having 0.8 to 2.6 organic groups per silicon atom and formed of units selected from the group consisting of $R_3SiO_{0.5}$, R_2SiO, $RSiO_{1.5}$, SiO_2 and $O_{3-b}R_{b/2}SiQ_aSiR_bO_{3-b/2}$ in which R represents a monovalent organic group containing 1 to 20 carbon atoms, Q represents a divalent hydrocarbon radical having 1 to 12 carbon atoms, *a* is 0 or 1 and *b* is 0, 1 or 2,

the organosilicon compound forming 0.05 to 15% by weight of the emulsion or gel and the mixture of the surface active composition and the organo-silicon compound forming at most 60% of the weight of the emulsion or gel.

4,052,332

CATALYST REGENERATION WITH IMPREGNATION OF BISMUTH AND MOLYBDENUM

Michael Brian D'Amore, Wilmington, Del., and Arthur William Sleight, Kennett Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 20, 1976, Ser. No. 678,708

Int. Cl.² B01J *23/92;* C07C *121/02*

U.S. Cl. 252—413 **14 Claims**

1. A process for regenerating a catalyst of the general formula $A_aB_bC_cFe_dBi_eMo_fO_x$ wherein A is at least one element selected from the group consisting of an alkali metal, rare earth metal, tantalum and niobium, B is at least one element selected from the class consisting of nickel and cobalt, C is at least one element selected from the class consisting of phosphorus and arsenic, "*a*" and "*c*" are numbers from 0 to 3, "*b*" is a number from 0.1 to 20, "*d*" is a number from 0.1 to 8, "*e*" is a number from 0.1 to 6, "*f*" is a number from 8 to 16, and "*x*" is a number determined by the valence requirements of the other elements present, wherein said catalyst has become at least partially deactivated by exposure to ammoxidation conditions which exposure is accompanied by the loss of a portion of the molybdenum originally present in the catalyst, which process comprises impregnating said catalyst with molybdenum and bismuth, separating the catalyst thus impregnated from any bismuth and molybdenum not absorbed by the catalyst and thereafter calcining the catalyst by heating the catalyst to a temperature in the range of about 300°–700° C in an oxidizing atmosphere to form a regenerated catalyst wherein the mole ratio of added molybdenum to bismuth is in the range 0.5–20 and at least 50% of the molydbenum lost is replaced.

13. A process for regenerating an ammoxidation catalyst which catalyst comprises the combined oxides of potassium, cobalt, nickel, iron, bismuth, phosphorus and molybdenum on a silicon oxide support and in powder form, wherein said catalyst has become at least partially deactivated by exposure to ammoxidation conditions said process comprising thoroughly contacting said catalyst with a solution prepared by dissolving sufficient molybdenum trioxide and phosphoric acid in water to provide a solution having at least 29 grams/liter of molybdenum and at least 0.8 gram/liter of phosphorus, adding nitric acid and finally dissolving sufficient bismuth nitrate pentahydrate in the resultant solution to provide a solution having at least 11 grams/liter of bismuth, separating the catalyst from any solution not absorbed therein and calcining the catalyst thus treated at a temperature in the range 450°–650° C in an oxidizing atmosphere to form an active catalyst.

4,052,333

CATALYST TREATMENT

Emerson H. Lee, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed June 25, 1976, Ser. No. 699,779

Int. Cl.² B01J *23/92*

U.S. Cl. 252—416 **5 Claims**

1. A process for the regeneration of a spent olefin ammoxidation catalyst in which at least 20% of the atoms of the active metallic elements in the catalyst are molybdenum atoms which comprises heating the catalyst at a temperature of from 400° to 650° C and at a pressure of from 1.0 to 2.0 kg/cm² in an atmosphere comprising from 20 to 45% by volume of steam, the balance being air or a gas inert to the catalyst under the above conditions, for a period of at least one hour.

5. A process for the regeneration of an olefin ammoxidation catalyst composition defined by the following formula:

$$Mo_{12}Bi_aFe_bM_mE_nX_xZ_yO_z$$

where M is an alkali metal, E is an alkaline earth metal, X is phosphorus, arsenic or antimony, Z is cobalt or nickel, *a* and *b*

are from 0.1 to 12, *m* is 0.1 to 8, *e* is from 0 to 8, *x* is from 0 to 6, *z* is from 0 to 12 and *n* is a number determined by the valence requirements of the other elements present, *a, b, m, e, x,* and *z* being chosen such that molybdenum provides at least 20% of the atoms of the active metallic element in the catalyst, which process comprises heating the catalyst composition at substantially atmospheric pressure and a temperature of from 500° to 550° C for a period of 1 to 24 hours under an atmosphere consisting of a mixture of air and steam with a partial pressure of steam of from 200 to 300 mm.

4,052,334

CATALYST SUPPORT

Keith Henry George Mockett, Allos, Scotland, assignor to BP Chemicals Limited, London, England

Filed June 1, 1976, Ser. No. 691,553

Claims priority, application United Kingdom, June 10, 1975, 24789/75

Int. Cl.² B01J *31/02, 27/24, 27/06, 21/08*

U.S. Cl. 252—429 R **8 Claims**

1. A process for producing a pelleted silica support for catalysts comprising heating to cure a shaped article, formed from a mixture of an ionic detergent, finely divided silica powder and colloidal silica and containing water in the range of 5 to 40% by weight of the total mixture sufficient to prevent the shaped article from disintegrating on heating at elevated temperature.

4,052,335

CATALYST FOR THE PRODUCTION OF GAMMA-BUTYROLACTONE AND A METHOD FOR PREPARING THE CATALYST

Georg Michalczyk, Neukirchen-Vluyn, and Karl-Heinz Gluzek, Alpen, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Division of Ser. No. 583,363, June 4, 1975, Pat. No. 3,994,928. This application May 17, 1976, Ser. No. 686,853

Claims priority, application Germany, June 18, 1974, 2429085

Int. Cl.² B01J *21/08, 21/18, 23/44, 23/74*

U.S. Cl. 252—446 **7 Claims**

1. A catalyst consisting of cobalt oxide and palladium on silica, wherein said catalyst comprises from about 20 to 30 percent cobalt oxide and from 0.5 to 1.0 weight percent palladium.

4,052,336

PROCESS FOR PREPARING NOBLE METAL CATALYSTS

Abraham van Montfoort, Geleen, and Joseph J. F. Scholten, Sittard, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Mar. 9, 1976, Ser. No. 665,442

Claims priority, application Netherlands, Mar. 13, 1975, 7502968

Int. Cl.² B01J *23/40, 23/42, 23/44, 21/18*

U.S. Cl. 252—447 **13 Claims**

1. In a process for preparing active noble-metal catalyst on a carbon carrier by adsorbing at least one water-soluble salt of a catalytically active metal onto the carbon in an aqueous medium, by hydrolyzing said salt by treating the salt with a basic reagent to form the oxide or hydroxide, and by reducing said oxide or hydroxide to the metal, the improvement comprising employing an active carbon having an acid to neutral reaction in water and an internal surface area of at least 300 m^2/g and up to about 1000 m^2/g with a particle size between 1 and 60 microns and with an ash content that does not exceed 3.5% by weight, whose ratio between (1) the pore volume, of the pores between 20 to 1000A plug the pores exceeding 1000A and (2) the total pore volume of said particles lies between 0.6 and 1.0 whereby the hydrolysis of the noble metal salt and the reduction of the oxide or hydroxide formed thereby are carried out in a single processing step with liquid hydrolyzing and reducing agents.

4,052,337

CATALYST FOR REDUCTION OF NITROGEN OXIDES AND PROCESS FOR PREPARING SAME

Eiichiroh Nishikawa; Takuji Itoh; Tsugio Maeshima, and Setsuo Kamiyama, all of Ohi, Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1976, Ser. No. 668,608

Claims priority, application Japan, Mar. 28, 1975, 50-37676

Int. Cl.² B01J *29/06, 8/00;* **C01B** *21/00*

U.S. Cl. 252—455 Z **2 Claims**

1. A process for preparing a catalyst for reduction of nitrogen oxides, characterized in that:

a. a synthetic crystalline aluminosilicate is contacted with a solution containing one or more alkaline earth metal ions to ion-exchange the alkali metals in the synthetic crystalline aluminosilicate with the alkaline earth metal(s) so that the alkali metal content remaining will be within the range from 0.2 to 0.6 equivalents per gram atom of alumina; (b) the ion-exchanged synthetic crystalline aluminosilicate is calcined, if necessary; and (c) the synthetic crystalline aluminosilicate is contacted with a solution containing one or more active metal ions having an effect of reducing nitrogen oxides, whereby the active metal component(s) is (are) carried on the aluminosilicate by impregnation.

4,052,338

DEHYDROGENATION CATALYST

Gregor H. Riesser, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 593,335, July 3, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 740,262

Int. Cl.² B01J *23/04, 23/84, 23/86*

U.S. Cl. 252—470 **16 Claims**

1. A catalyst for the dehydrogenation of hydrocarbons to more unsaturated hydrocarbons comprising a mixture having:

a. from about 35 to about 67 percent by weight of an iron oxide, measured as iron metal;

b. from about 4 to about 25 percent by weight of a potassium compound selected from the group consisting of potassium oxide, potassium carbonate, and mixtures thereof, measured as potassium metal;

c. from about 0.0065 to about 4.5 percent by weight of a chromium oxide, measured as chromium metal;

d. from about 0.5 to about 3.5 percent by weight of a vanadium oxide, measured as vanadium metal, and

e. from about 0.0075 to about 8 percent by weight of a cobalt oxide, measured as cobalt metal.

4,052,339

REFRACTORIES AND METHODS OF MAKING SAME

Darryl J. Costin, Columbus, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed June 10, 1974, Ser. No. 477,705

Int. Cl.² H01B *1/02;* **H01C** *1/02*

U.S. Cl. 252—512 **22 Claims**

1. A new and improved refractory of controlled conductivity, consisting essentially of: essentially pure particles each having a crystalline oxide lattice of an element from the class consisting of, a Group IV, Group V, or Group VI element, the lattice of said particles containing a dopant having a valence different from said element of said lattice and having an atomic radius sufficiently similar to that of the lattice forming element that it diffuses into said lattice without forming deposits at the grain boundaries between the particles and in an amount not appreciably exceeding the solubility of said dopant in said lattice, said refractory being generally devoid of Group I and II fluxing elements at the grain boundaries, and said particles being sintered together to form a refractory body.

4,052,340

METHOD FOR PRODUCING A VOLTAGE DEPENDENT RESISTOR AND A VOLTAGE DEPENDENT RESISTOR OBTAINED THEREWITH

Ronald Karel Eijnthoven, and Johannes Trudo Cornelis van Kemenade, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,537

Claims priority, application Netherlands, Nov. 13, 1974, 7414775

Int. Cl.[2] H01B *1/08*

U.S. Cl. 252—518 3 Claims

1. In a method for producing a voltage dependent resistor consisting mainly of a sintered body of zinc oxide and about 0.1–10% by weight of bismuth oxide in which, there is optionally present, small quantities of oxides of other metals and which body is provided, at opposite faces thereof, with ohmic electrodes, wherein the improvement comprises sintering a mixture of zinc oxide and oxides of metals which may be optionally present, at a temperature of between about 900° C – 1450° C, in an atmosphere containing bismuth oxide to produce a sintered body and then applying the ohmic electrodes to the resultant sintered body.

4,052,341

3-METHYL-5-(2,2,3-TRIMETHYLCYCLOPENT-3-EN-1-YL)PENTAN-2-OL COMPOUND AND PERFUME COMPOSITIONS

Richard E. Naipawer, Wallington, and William M. Easter, Hasbrouck Heights, both of N.J., assignors to Givaudan Corporation, Clifton, N.J.

Filed Apr. 29, 1976, Ser. No. 681,351

Int. Cl.[2] C11B *9/00*

U.S. Cl. 252—522 17 Claims

1. A composition consisting essentially of from less than 100% to more than 60% of 3-methyl-5-(2,2,3-trimethylcyclopent-3-en-1-yl)pentan-2-ol and a definite amount, but not more than 40%, of 6-(2,2,3-trimethylcyclopent-3-en-1-yl)hexan-3-ol.

4,052,342

SECONDARY ALKYL SULFATE: ALCOHOL ETHOXYLATE MIXTURES

George W. Fernley, and Cecil M. Stone, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 13, 1976, Ser. No. 657,805

Claims priority, application United Kingdom, July 17, 1975, 30037/75

Int. Cl.[2] C11D *1/14*

U.S. Cl. 252—541 3 Claims

1. A detergent composition consisting essentially of a first component selected from the group consisting of a potassium, sodium, ammonium and amine salt of a low crystalline fraction secondary alkyl sulfate derived from C_{13} to C_{15} olefins having less than about 70% of the sulfate groups on the 2- and 3-carbon atoms and a second component consisting of C_9 to C_{11} alcohol ethoxylates containing on the average eight moles of ethylene oxide per mole of alcohol prepared by hydroformylating and ethoxylating a mixture of C_8 to C_{10} olefins and wherein the weight ratio of said first component to said second component ranges from about 3:1 to about 1:1.

4,052,343

CROSSLINKED, MACRORETICULAR POLY(DIMETHYLAMINOETHYL METHACRYLATE) ION-EXCHANGE RESINS AND METHOD OF PREPARATION BY AQUEOUS SUSPENSION POLYMERIZATION USING TRIALKYLAMINE PHASE EXTENDER

Virginia L. Cunningham, Hatboro, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Nov. 10, 1975, Ser. No. 630,477

Int. Cl.[2] C08F *20/34, 2/18*

U.S. Cl. 260—2.1 E 2 Claims

1. A process for preparing a cross-linked macroreticular ion-exchange polymer of dimethylaminoethyl methacrylate which process comprises copolymerizing dimethylaminoethyl methacrylate by suspension polymerization in an aqueous medium with from about 0.5% to about 30% by weight of the total polymer mixture of a polyfunctional crosslinking monomer in the presence of between about 20% and 80% by weight of a trialkylamine phase extender, based on the total weight of the organic mixture, said trialkylamine having alkyl substituents of 2 to 8 carbon atoms.

4,052,344

METHOD OF RECLAIMING SCRAP VULCANIZED RUBBER AND THE SOLUBLE RECLAIMED RUBBER THUS PRODUCED

Grant Crane, and Edward Leo Kay, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed May 30, 1973, Ser. No. 365,381

Int. Cl.[2] C08J *11/04*

U.S. Cl. 260—2.3 9 Claims

1. The process of producing a soluble reclaimed rubber from vulcanized rubber by the steps of

combining a first charge of vulcanized rubber with a hydrocarbon solvent in the ratio of about 10 to 100 parts of rubber to 100 parts of solvent, by weight,

maintaining the resultant mixture at a temperature of from 400° to 700° F. until the rubber is solubilized,

adding to the solubilized mixture thus formed at least one additional charge of vulcanized rubber in an amount sufficient to increase the rubber content of the mixture to at least 60 percent by weight.

while maintaining the temperature of the mixture between 400° and 700° F, until all of the vulcanized rubber has been solubilized.

4,052,345

PROCESS FOR THE PREPARATION OF POLYURETHANE FOAMS

Arthur L. Austin, Southgate; William W. Levis, Jr., Wyandotte; Louis C. Pizzini, Trenton, and Robert J. Hartman, Southgate, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Division of Ser. No. 425,524, Dec. 17, 1973, Pat. No. 3,957,922. This application June 25, 1975, Ser. No. 590,333

Int. Cl.[2] C08G *18/14*

U.S. Cl. 260—2.5 AP 20 Claims

1. In a process for preparing a polyurethane foam which comprises mixing and reacting a polyol, a polyarylpolyalkylene polyisocyanate, a polymerization catalyst, a wetting agent and a blowing agent, the improvement which comprises using as a polyol therein, based on the total weight of the ingredients, 20 to about 100 parts of an oxyalkylation polyol product prepared by the process of

1. providing a reaction mixture containing

a. a phenol, at least in an amount sufficient to form a complex with aluminum or iron substances in the mixture,

b. a non-phenolic active hydrogen compound having from 2 to 8 active hydrogens per molecule and hav-

ing an average molecular weight below about 10,000, and

c. a substance containing aluminum or iron which will form a complex with the phenol a), in an amount sufficient to form a complex with the phenol a),

2. heating the mixture to a temperature in the range of from about 80° C. to about 250° C., and

3. oxyalkylating the heated mixture by adding thereto sufficient alkylene oxide having from 2 to 12 carbon atoms to form an oxyalkylated polyol product, per

40 to about 60 parts of a polyarylpolyalkylene polyisocyanate having a functionality of about 2.2 to about 3.3 or of an isocyanate-terminated prepolymer derived from the reaction of a stoichiometric excess of said polyarylpolyalkylene polyisocyanate with said oxyalkylation polyol,

0.2 to about 2 parts of a polymerization catalyst,

0.15 to about 3 parts of a wetting agent, and

5 to about 30 parts of a blowing agent.

4,052,346
FLAME-RETARDANT POLYURETHANE FOAM COMPOSITIONS

Bernard Rudner, Ridgewood, N.J., and Peter Daniel Pauly, Mountaintop, Pa., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed June 3, 1975, Ser. No. 583,329
Int. Cl.[2] C08G *18/14*
U.S. Cl. 260—2.5 AM **12 Claims**

1. In a process for the in situ preparation of a flexible, nonlustrous, substantially membrane-free polyurethane foam from a reaction mixture comprising one or more polyols selected from the group consisting of polyester polyols and polyether polyols, an organic polyisocyanate, water, a hydrophilic organosilicon foam-stabilizing emulsifier-surfactant designed and adapted for use in the preparation of urethane polymer foam from a polyether polyol and an organic polyisocyanate, and a cell-opener selected from the group consisting of hydrophobic anti-foaming organosilicon compounds, and esters of the formula $(RCOO)_n R'$, R and R' in the preceding formula being alkyl or alkenyl groups having from 1 to 30 carbon atoms, at least one of R and R' having at least 3 carbon atoms and *n* being an integar from one to three, with the proviso that when *n* is one at least one of R and R' has at least 8 carbon atoms, the amount of cell opener being from about 0.1 to about 3 parts by weight of hydrophobic anti-foaming organosilicon compound or from about 2 to about 10 parts per weight of ester of the formula $(RCOO)_n R'$ per 100 parts total weight of said polyols, the improvement which comprises including in the reaction mixture a flame-retarding amount of tribromoneopentyl alcohol whereby a permanently flame-retardant open-cell foam is obtained.

4,052,347
INORGANIC-ORGANIC COMPOSITIONS

Dieter Dieterich, and Peter Markusch, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 13, 1974, Ser. No. 469,254
Claims priority, application Germany, May 17, 1973, 2325090
Int. Cl.[2] C08G *18/12, 18/14;* C08K *3/34*
U.S. Cl. 260—2.5 AK **27 Claims**

1. An inorganic-organic composition obtained by reacting a mixture of

A. from 5–98% by weight of an organic, non-ionic-hydrophilic polyisocyanate prepared by reacting an excess of an organic polyisocyanate with an organic hydrophilic compound containing at least one group which is reactive with isocyanate groups, and

B. from 2–95% by weight of an aqueous alkali metal silicate solution containing about 20–70% by weight of alkali metal silicate based on the weight of said aqueous solution, the percents by weight of (A) and (B) based on the total weight of (A) and (B), said composition being a solid/solid xerosol.

4,052,348
MOLDING COMPOSITIONS

Alva F. Harris, and Peter Shapras, both of Wilbraham, Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Jan. 15, 1973, Ser. No. 323,772
Int. Cl.[2] C08L *7/00, 25/12*
U.S. Cl. 260—5 **5 Claims**

1. A process for preparing an extruded, pelleted molding composition for use in food, beverages and other related packaging applications which process comprises:

A. Dry blending a nitrile polymer, having an extractable HCN content greater than 20 PPB, in an essentially solvent free condition with a formaldehyde compound containing from 0.0005 to 2% by weight of available formaldehyde based on the weight of the nitrile polymer, wherein the nitrile polymer is a polymer of acrylonitrile and at least one comonomer selected from the group consisting of styrene, alpha-methyl styrene, methacrylonitrile, lower alpha olefins containing 2 to 6 carbon atoms, alkyl esters of acrylic and methacrylic acid wherein the alkyl group contains from 1 to 4 carbon atoms, vinyl acetate and alkyl vinyl ethers wherein the alkyl group contains from 1 to 4 carbon atoms, and mixtures thereof; wherein the polymer contains from 60 to 85% by weight of acrylonitrile and from 0 to 16% by weight of methacrylonitrile, based on the total polymer weight;

B. Heating and extruding the resulting blend in a molten state and then

C. Pelletizing the extruded polymer.

4,052,349
EPOXY COMPOSITION CONTAINING A CHLORINE-CONTAINING POLYOL AND ITS USE AS AN ADHESIVE

Richard J. Turley, Orange, and Alexandre Ozolins, New Haven, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Oct. 28, 1975, Ser. No. 625,903
Int. Cl.[2] C08L *5/00*
U.S. Cl. 260—17.2 **12 Claims**

1. A liquid, curable epoxy composition comprised of a. an epoxy resin having more than one α-epoxy group in the molecule,

b. a curing agent for said resin, and

c. a chlorine-containing polyol having an average of 2–8 hydroxy groups and at least one (2,2-dichlorovinyl) ethylene group in the polyol chain.

4,052,350
CHLORINE-CONTAINING RESIN COMPOSITION

Tomoo Shiohara; Minoru Kohara, both of Kyoto, and Hiroshi Miyoshi, Takatsuki, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 28, 1975, Ser. No. 636,199
Claims priority, application Japan, Apr. 11, 1975, 50-44436; Sept. 19, 1975, 50-113914; Nov. 27, 1974, 49-137509
Int. Cl.[2] C08K *3/34*
U.S. Cl. 260—23 XA **17 Claims**

1. A chlorine-containing resin composition comprising a chlorine-containing resin selected from the group consisting of polyvinyl chloride, polyvinylidene chloride, a vinyl chloridevinylidene chloride copolymer, a vinyl chloride-vinyl acetate copolymer, a vinyl chloride-ethylene copolymer, a chlorinated polyvinyl chloride and chlorinated polyethylene and at least one calcium compound selected from the group consisting of

$CaO.TiO_2$, $2CaO.TiO_2$, $3CaO.TiO_2$,
$CaO.Al_2O_3$, $2CaO.Al_2O_3$, $3CaO.Al_2O_3$, $CaAl_2O_4$,
CaB_2O_6, $Ca_7MgAl_{10}O_{23}$, $CaNb_2O_6$, $CaTa_2O_6$, $CaTiO_3$,

$CaZrO_3$, $CaZrTi_2O_7$, $2CaO.SiO_2$, $3CaO.SiO_2$ or $3CaO.2SiO_2$

wherein said calcium compound is present in said composition in an amount of about 0.5 to about 20 parts by weight per 100 parts by weight of said chlorine-containing resin.

4,052,351

STABILIZATION OF OLEFIN POLYMERS

James S. Dix, Greenville, and Ronald D. Mathis, Taylors, both of S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.

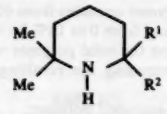
Filed Aug. 4, 1975, Ser. No. 601,734
Int. Cl.² C08L 93/00
U.S. Cl. 260—23 H **17 Claims**

1. A polyolefin composition stabilized against ultraviolet degradation comprising a normally solid polymer of an aliphatic 1-olefin having from 2 to 8 carbon atoms per molecule having incorporated therein a stabilizing amount of an ultraviolet light stabilizing system consisting of:

A. a nickel salt of a saturated fatty acid having from 8 to 20 carbon atoms per molecule, and

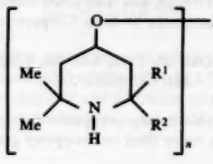
B. a piperidine derivative selected from the group consisting of

1. compounds of the formula



wherein Me is methyl, and R^1 and R^2 are individually selected from the group consisting of hydrogen and an alkyl member of 1 to 4 carbon atoms;

2. compounds of the formula

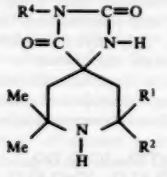


wherein Me, R^1 and R^2 are as described above, and n is an integer having a value of 1 or 2, wherein

when n is 1, R^3 is selected from the group consisting of hydrogen and an acyl member derived from a saturated, unsubstituted aliphatic monocarboxylic acid having from 6 to 20 carbon atoms or an unsubstituted or alkyl-substituted aromatic monocarboxylic acid having from 7 to 20 carbon atoms,

when n is 2, R^3 is a diacyl member derived from a saturated, unsubstituted aliphatic dicarboxylic acid having from 6 to 20 carbon atoms or an unsubstituted or alkyl-substituted aromatic dicarboxylic acid having from 8 to 20 carbon atoms; and

3. compounds of the formula



wherein Me, R^1 and R^2 are as defined above and R^4 is a member selected from the group consisting of hydrogen and alkyl having from 1 to 12 carbon atoms.

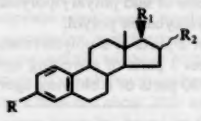
4,052,352

TETRAHYDROPYRANYL ETHERS OF ESTROGENS

Pietro de Ruggieri, and Orazio Sighinolfi, both of Milan, Italy, assignors to Farmilla Farmaceutici Milano S.p.A., Italy

Filed Nov. 19, 1975, Ser. No. 633,474
Claims priority, application Italy, Dec. 13, 1974, 30574/74
Int. Cl.² C07J 17/00
U.S. Cl. 260—239.55 R **5 Claims**

1. Compounds of the formula:



where R is 2'-tetrahydropyranyloxy; R_1 is beta-hydroxy; R_2 is beta-hydroxy with the proviso that, when R_1 and R_2 are beta-hydroxy, R is 2'-tetrahydropyranyloxy.

2. A process for preparing 3-(2'-tetrahydropyranyloxy)-estra-1,3,5(10) — trien-16 beta, 17 beta — diol which comprises reacting a corresponding 3-benzyloxy — 16 beta, 17 beta-dihydroxy compound with an acetic anhydride or an acetyl chloride, subjecting the 16, 17-diester so-obtained to hydrogenolysis of the benzyl group in an organic solvent, etherifying the phenolic function thus liberated with 2,3-dihydropyran in the presence of an acid catalyst selected from the group consisting of p-toluenesulphonic acid, $POCl_3$ and HCl, and finally removing the acetate groups by alkaline hydrolysis.

4,052,353

DISPERSIONS OF WATER SOLUBLE POLYMERS IN OIL

Clyde S. Scanley, 330 Speedwell Ave., Morristown, N.J. 07960

Continuation-in-part of Ser. No. 429,548, Jan. 2, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,231
Int. Cl.² C08F 2/32
U.S. Cl. 260—29.6 PM **8 Claims**

1. A self water dissolving composition of a water soluble polymer dispersed in oil which is stable to polymer coagulation and agglomeration, comprising:

a water soluble polymer dispersed in oil, said polymer having a water content at which the polymer remains finely divided and dispersed in the oil, said water content being less than 40%, by weight, based on polymer and water, said water soluble polymer dispersed in oil having been prepared from a water in oil emulsion of said water soluble polymer by reduction of the water content thereof; and

a water soluble surfactant, having an HLB number of above 8 in an amount effective to render the water soluble polymer self dissolving in water.

4,052,354

AQUEOUS ANTIFOULING COATING COMPOSITION COMPRISED OF EMULSIFIED WATER-INSOLUBLE POLYMER AND TRIPHENYLTIN DERIVATIVE

Charles B. Beiter, Carteret, and Lee A. Hafner, Edison, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Filed Apr. 30, 1973, Ser. No. 355,405
Int. Cl.² C08L 31/00; C09D 5/14; C08L 31/02
U.S. Cl. 260—29.6 M **2 Claims**

1. A stable antifouling coating composition comprising

a. a liquid carrier wherein between 50 and 100% by weight of said carrier is water, the remainder being selected from water-miscible liquid organic compounds;

b. between 8 and 40%, based on the weight of said composi-

tion, of an emulsified water-insoluble film-forming polymer selected from the group consisting of homopolymers of acrylic acid, methacrylic acid and esters of acrylic and methacrylic acids wherein the alcohol residue of said ester contains between 1 and 12 carbon atoms, and copolymers of said acids and esters; and

c. between 5 and 50%, based on the weight of said coating composition, of triorganotin compound wherein the three hydrocarbon radicals bonded to the tin atom are selected from the group consisting of phenyl radicals and inertly substituted phenyl radicals and the remaining valence of the tin atom is satisfied by a radical selected from the group consisting of halogen, nitrate, hydroxyl, radicals derived from removal of the hydrogen atom from the carboxy radical of a carboxylic acid containing between 1 and 20 carbon atoms, oxygen, sulfur and sulfate; and

d. between 0 and 40%, based on the weight of said composition, of a pigment;

the total of (a), (b), (c) and (d) constituting between 90 and 99.89% by weight of said composition, 0.11 to 10% being selected from the group consisting of anti-microbial agents, wetting agents and surface tension depressants, with the proviso that non-volatile materials constitute between 30 and 75% by weight of said composition.

4,052,355

ACRYLONITRILE POLYMER SOLUTIONS

Theo Neukam, Dormagen; Francis Bentz, Cologne, and Günther Nischk, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 18, 1976, Ser. No. 658,904

Claims priority, application Germany, Feb. 22, 1975, 2507777

Int. Cl.[2] C08F *4/34, 20/44;* C08K *5/34*

U.S. Cl. 260—30.2 **17 Claims**

1. A process for the production of a spinnable solution of acrylonitrile homopolymer or a copolymer of at least 90% by weight of acrylonitrile and up to 10% by weight of an unsaturated copolymerizable monomer which comprises polymerizing acrylonitrile or a mixture of acrylonitrile and an unsaturated copolymerizable monomer in an organic solvent in the presence of a catalyst system comprising an acid, a peroxodisulphate and a 1,3-diketone in which said acid is nitric acid, phosphoric acid, hydrochloric acid, sulphuric acid, benzene sulphonic acid, α-naphthalene sulphonic acid, β-naphthalene sulphonic acid, 3-chlorobenzene sulphonic acid, 1,3-benzene disulphonic acid or oxalic acid; the molar ratio of peroxodisulphate to 1,3-diketone is 1.1.:1 to 1:3; to molar ratio of 1,3-diketone to acid is 1.2:1 to 3.2:1; and said acid and the amount thereof is such that the acrylonitrile polymer or copolymer produced is less colored and has a K-value higher than is obtained by the same process conducted without said acid.

4,052,356

MOLDING COMPOUNDS BASED ON POLYBUTYLENE TEREPHTHALATE

Franz Breitenfellner, Bensheim, and Josef Hrach, Einhausen, both of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 6, 1976, Ser. No. 674,258

Claims priority, application Switzerland, Apr. 18, 1975, 4993/75

Int. Cl.[2] C08K *3/34*

U.S. Cl. 260—40 R **6 Claims**

1. A moulding compound with improved arc resistance and tracking resistance, consisting of

a. a polybutylene terephthalate,

b. 5 to 50 percent by weight, referred to the total composition, of a kaolin, and

c. 5 to 40 percent by weight, referred to the total composition, of a reinforcing filler, the amount of kaolin and reinforcing filler being at most 60 percent by weight of the total composition.

4,052,357

HIGH MODULUS SILICONE RUBBER

James A. Marinik, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed May 19, 1976, Ser. No. 687,733

Int. Cl.[2] C08L *83/04*

U.S. Cl. 260—37 SB **18 Claims**

1. A silicone rubber composition consisting essentially of

A. 100 parts by weight of polydiorganosiloxane gum where the organic radicals are selected from methyl, phenyl, vinyl, ethyl and 3,3,3-trifluoropropyl and mixtures thereof the polydiorganosiloxane gum having at least 50 percent of the organic radicals being methyl and no more than 2 percent being vinyl, the polydiorganosiloxane gums being endblocked with hydroxyl radicals or triorganosiloxy units where the organic radicals are defined above,

B. from 25 to 75 parts by weight of reinforcing silica filler,

C. from 5 to 20 parts by weight of hydroxylated diorganosilicon compound which has an average of about 2 hydroxyl radicals per molecule, at least 3 weight percent silicon-bonded hydroxyl radicals based on the weight of the hydroxylated diorganosilicon compound, and the organic radicals are selected from a combination of methyl, phenyl and vinyl, there being from 10 to 50 percent phenyl radicals, from 2 to 20 percent vinyl radicals and the remainder being methyl radicals,

D. from 20 to 80 parts by weight fiberized blast furnace slag fibers having an average length of from 0.0001 to 0.0005 meter and a diameter of 0.00001 to 0.00001 meter, and

E. from 0 to 10 parts by weight of alkoxy silicon compound having at least 25 weight percent silicon-bonded alkoxy radical selected from methoxy, ethoxy and propoxy and any remaining monovalent organic groups attached to silicon atoms being bonded through silicon-carbon bonds and being selected from methyl, ethyl and vinyl.

4,052,358

PIGMENTABLE LOW-SHRINKAGE UNSATURATED POLYESTER RESIN COMPOSITION

Moriyasu Wada, Kanagawa; Katuya Kumagai, and Takashi Kamo, both of Kawasaki, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki and Toshiba Chemical Products Co., Ltd., Tokyo, both of Japan

Filed Feb. 19, 1976, Ser. No. 659,583

Claims priority, application Japan, Mar. 5, 1975, 50-26031

Int. Cl.[2] C08K *7/14;* C08L *67/06*

U.S. Cl. 260—40 R **9 Claims**

1. A pigmentable low-shrinkage unsaturated polyester resin composition comprising a mixture of:

25 to 70% by weight of unsaturated polyester based on a reaction product of a dicarboxylic acid component comprising α,β-unsaturated dicarboxylic acid with a glycol component comprising, on the basis of the total amount of the glycol component, 15 to 70 mol% of neopentyl glycol and 10 to 30 mol% of 2,2-bis(4-hydroxycyclohexyl) propane;

60 to 18% by weight of unsaturated monomer copolymerizable with the unsaturated polyester; and

45 to 4% by weight of polystyrene or a butadiene modified polystyrene having such a particle size as to pass through a 50-mesh screen.

4,052,359
DILUTABLE RESOLE RESIN SOLUTIONS HAVING STABILIZED DISPERSED INERT SALTS

Harold P. Higginbottom, Wilbraham, Mass., assignor to Monsanto Company, Saint Louis, Mo.

Filed Feb. 18, 1976, Ser. No. 658,988

The portion of the term of this patent subsequent to Mar. 8, 1994, has been disclaimed.

Int. Cl.² C08L *61/10, 97/00*

U.S. Cl. 260—17.5 **22 Claims**

1. A stable dilutable aqueous solution of a resole resin having pH of 3 to 8.5 comprising:
   a. said resole resin having a number average molecular weight is less than about 250, a water tolerance greater than 500 percent, a combined formaldehyde to phenol ratio in the range of from about 1.0:1 to 2.9:1,
   b. a dispersion of insoluble oxalate salt particles, wherein, said resole being prepared with a catalyst comprising alkaline earth metal hydroxides selected from the group consisting of magnesium, calcium, barium strontium and mixtures thereof, said pH being adjusted with a compound selected from the group consisting of oxalic acid, ammonium oxalate and mixtures thereof providing a dispersion of insoluble oxalate salt particles of said alkaline earth metal ions in said solution, and
   c. said solution having present an anionic dispersing agent in an amount of from about 0.10 to 20 percent based on the weight of said resole resin, said dispersing agent being selected so as to prevent flocculation of said particles when water, up to the water tolerance of said resole resin is added to said solution.

4,052,360
REINFORCED FLAME RETARDANT POLYESTER COMPOSITION HAVING NON-DRIP CHARACTERISTICS

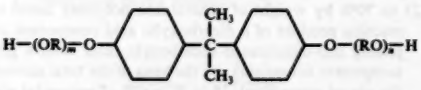
Frank M. Berardinelli, Millington, N.J., and Robert Edelman, Staten Island, N.Y., assignors to Celanese Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 617,201, Sept. 24, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,528

Int. Cl.² C08G *3/36;* C08K *3/22*

U.S. Cl. 260—40 R **21 Claims**

1. A process for preparing a reinforced flame retardant copolyester molding resin composition having non-drip characteristics comprising intimately mixing
   A. at least one reinforcing agent
   B. at least one Group Vb metal-containing compound, and
   C. the molten reaction product of
      1. a copolyester of
         a. at least one alkane diol having from two to six carbon atoms selected from the group consisting of ethylene glycol, 1,3-propane diol, 1,4-butane diol, 1,5-pentane diol, and 1,6-hexane diol,
         b. terephthalic acid, isophthalic acid, or a dialkyl ester thereof wherein the alkyl radical contains from 1 to 7 carbon atoms, and
         c. a halogenated derivative of the bishydroxyethylether of p,p'-isopropylidenediphenol, having the formula



wherein the aromatic nuclei of the p,p'-isopropylidenediphenol are substituted with from one to four halogen atoms, R is a bivalent hydrocarbon radical containing from two to six carbon atoms, m and n are integers of from 1 to 10, and the halogenated derivative of the bishydroxyethylether of p,p'-isopropylidenediphenol comprises from about 8 to about 40% by weight of the copolyester composition, and

2. at least one polycarbodiimide, which polycarbodiimide both
   a. is derived from at least one aromatic diisocyanate which is either unsubstituted or contains up to one methyl substituent on each aromatic ring, and
   b. contains at least three carbodiimide units per polycarbodiimide molecule, whereby said resulting reinforced copolyester molding resin composition is flame retardant and exhibits non-drip characteristics.

4,052,361
N-(2,2-DIMETHYL-6,6-DI(LOWER ALKYL)-4-PIPERIDINYL)-AMIDES OF HINDERED 3,5-DIALKYL-4-HYDROXYBENZOIC ACIDS AND USE AS LIGHT STABILIZERS IN POLYOLEFINS

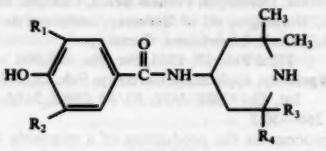
Peter Vincent Susi, Middlesex, and John Christian Oppelt, Somerville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 30, 1974, Ser. No. 537,152

Int. Cl.² C08K *5/34*

U.S. Cl. 260—45.8 N **10 Claims**

1. A polyolefin stabilized against the deteriorating effects of light by having incorporated therein an effective amount of a light stabilizer of the formula:



wherein R_1 and R_2 are each branch-chain alkyl of 3 to 8 carbon atoms and R_3 and R_4 are each alkyl of 1 to 4 carbon atoms.

4,052,362
OLEFIN POLYMER COMPOSITION

Toshio Yoshikawa; Nagayoshi Sakamoto; Masayuki Kurita; Shunji Oh-e, and Tomitada Nagamori, all of Ichihara, Japan, assignors to Ube Industries, Ltd., Ube, Japan

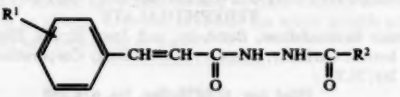
Filed Sept. 14, 1976, Ser. No. 723,092

Claims priority, application Japan, Jan. 30, 1976, 51-8389; May 18, 1976, 51-56075

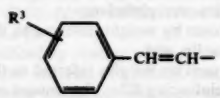
Int. Cl.² C08K *5/25*

U.S. Cl. 260—45.9 NC **12 Claims**

1. An olefin polymer composition which comprises 100 parts by weight of an olefin polymer and from 0.001 to 5 parts by weight of a compound having the formula

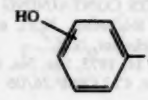


in which R^1 represents a hydrogen atom, a halogen atom, a hydroxyl group, an alkyl group having 1 – 3 carbon atoms or an alkoxy group having 1 – 3 carbon atoms, and R^2 represents a group of the formula

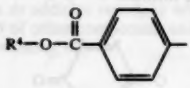


in which R^3 represents a hydrogen atom, a hydroxyl group, an

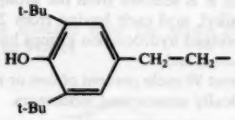
alkyl group having 1 – 3 carbon atoms, an alkoxy group having 1 – 3 carbon atoms, a group of the formula



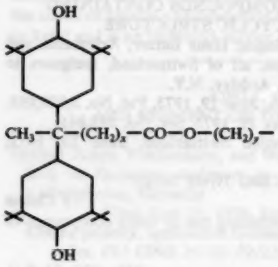
a group of the formula

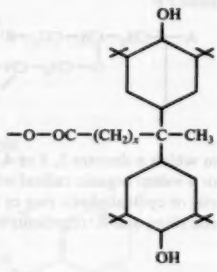


in which R^4 represents an alkyl group having 1 – 3 carbon atoms, or a group of the formula



(I)





in which x is zero or a whole number in the range of from 1 to 8 and y is a whole number in the range of from 2 to 18.

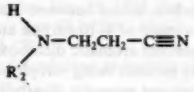
4,052,363

METHOD OF PROTECTION FROM OZONE DETERIORATION FOR RUBBER

Shuichi Kanagawa, Osaka; Shozo Tanimura, Minoo, and Seiji Sagawa, Kawachinagano, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Nov. 5, 1975, Ser. No. 629,130
Claims priority, application Japan, Nov. 14, 1974, 49-131763
Int. Cl.² C08K 5/17
U.S. Cl. 260—45.9 KA **8 Claims**

1. A method for inhibiting ozone deterioration of rubber which comprises adding to the rubber an effective antiozonant amount of a nitrile of the formula



wherein R'_2 is alkyl of 6–18 carbon atoms.

4,052,364

BIS(HYDROXY-DI-TERT.BUTYLPHENYL)-ALKANOIC ACID ESTERS

Yani Christidis, Paris, France; Otto Mauz, Liederbach, Taunus, and Eberhard Prinz, Kelkheim, Taunus, both of Germany, assignors to Nobel Hoechst Chimie, Puteaux, France and Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 30, 1975, Ser. No. 545,532
Claims priority, application France, Feb. 1, 1974, 74.03523
Int. Cl.² C07C 69/76
U.S. Cl. 260—45.85 B **3 Claims**

1. A crystalline bis(hydroxy-di-tert-butylphenyl)-alkanoic acid diester of the formula I

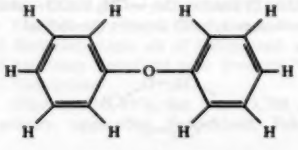
4,052,365

MANUFACTURE OF CRYSTALLIZABLE POLYMERIC PHENYLENE ETHER SULPHONE KETONES

Michael Edward Benet Jones, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 635,664, May 3, 1967, abandoned, which is a continuation-in-part of Ser. No. 320,508, Oct. 31, 1963, abandoned. This application June 24, 1974, Ser. No. 482,603
Claims priority, application United Kingdom, Nov. 6, 1962, 41976/62; Mar. 18, 1963, 10592/63; Oct. 3, 1963, 38973/63
The portion of the term of this patent subsequent to July 22, 1992, has been disclaimed.
Int. Cl.² C08G 67/00, 75/23
U.S. Cl. 260—49 **3 Claims**

1. A crystallizable copolymer containing phenylene, ether, sulphone and ketone groups in the polymer chain, which is formed of repeating units having the structure —Ar—SO_2— and repeating units of the structure —Ar—CO—, where Ar is a divalent aromatic residue derived from a compound having the structure:



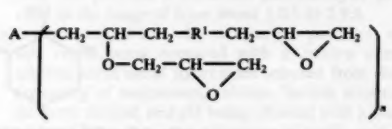
by removing the hydrogen atoms which are para to the oxygen atoms.

4,052,366
POLYGLYCIDYL COMPOUNDS CONTAINING N-HETEROCYCLIC STRUCTURE

Jürgen Habermeier, Pfeffingen; Hans Batzer, Arlesheim, and Daniel Porret, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

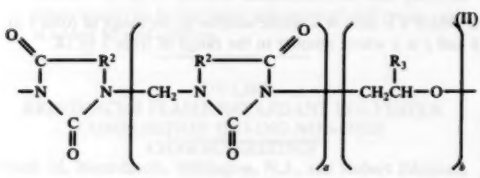
Division of Ser. No. 371,449, June 19, 1973, Pat. No. 3,900,493.
This application May 29, 1975, Ser. No. 582,041
Claims priority, application Switzerland, June 23, 1972, 9528/72
Int. Cl.² C08G 59/04, 59/26
U.S. Cl. 260—63 R 9 Claims

1. A curable mixture containing one or more compounds of the formula I



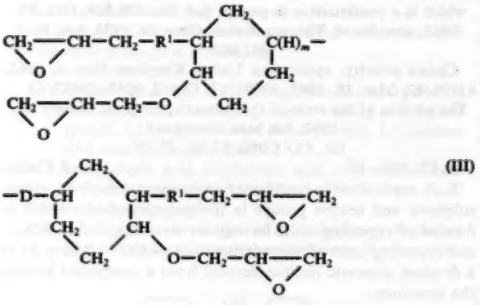
(I)

in which n denotes 2, 3 or 4, A represents a 2-valent, 3-valent or 4-valent organic radical which either contains a N-heterocyclic or cycloaliphatic ring or 2 N-heterocylic rings or 2 phenylene rings, and R^1 represents a divalent radical of the formula II



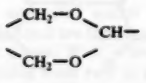
(II)

in which a and b are identical or different and denote either 0 or 1, and in which R^3 denotes a hydrogen atom or a methyl group and R^2 denotes a nitrogen-free 2-valent radical which is necessary to add sufficient ring carbon atoms to complete a five-membered or six-membered ring, or of the general formula III



(III)

in which either D denotes the —CH_2.O.CO— radical and m denotes the number 1, or D denotes the radical



and m denotes 0, and R^1 has the above meaning; and an epoxy resin curing agent.

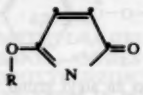
4,052,367
RADIATION SENSITIVE POLYMERS OF OXYGEN-SUBSTITUTED MALEIMIDES AND ELEMENTS CONTAINING SAME

John Charles Wilson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 14, 1975, Ser. No. 621,728
Int. Cl.² C08F 26/06
U.S. Cl. 260—63 UY 6 Claims

1. A radiation sensitive polymer comprising

A. from about 1 to 100 mole percent of a polymerized monomer having the formula



and polymerized through the ethylenically unsaturated bond wherein R is selected from the group consisting of alkyl, cycloalkyl, aryl each having from 2 to 20 carbon atoms, and bridged hydrocarbon groups having from 6 to 10 carbon atoms; and

B. from 0 to about 99 mole percent of one or more polymerized ethylenically unsaturated monomers.

4,052,368
WATER-DISPELLABLE HOT MELT POLYESTER ADHESIVES

Wayne K. Larson, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 21, 1976, Ser. No. 697,968
Int. Cl.² C08G 63/68
U.S. Cl. 260—75 S 13 Claims

1. A water-dispellable strong hot melt adhesive, resistant to degradation upon continued exposure to high temperatures and functional at high humidities, consisting essentially of a polyester resin which is normally solid at 20° C., has a ball-and-ring softening point greater than 35° C., fuses at a temperature between 35° C. and 200° C., has an intrinsic viscosity in the range of 0.1 – 1.0 and contains substantially equimolar amounts of the residue of

a. 100 mole percent dicarboxylic acid molecules consisting essentially of

1. 0–95 mole percent aliphatic dicarboxylic acid having at least two carbon atoms between carboxyl groups and having an average of 4–10 carbon atoms,
2. 0–95 mole percent aromatic dicarboxylic acid, no more than 85 mole percent being terephthalic acid, and
3. 5–25 mole percent aromatic dicarboxylic acid in which magnesium sulfonate or an alkali metal sulfonate is attached to an aromatic ring; and

b. 100 mole percent diol molecules consisting essentially of

1. 0–100 mole percent of a monoalkylene glycol containing 2 to 10 carbon atoms,
2. 0–100 mole percent polycaprolactonediol, and
3. 0–10 mole percent polyoxyalkylene glycol, the sum of the mole percentages of monoalkylene glycol residues and polycaprolactonediol residues being at least 90.

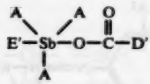
4,052,369
GROUP V PENTAVALENT ATOM-CONTAINING COMPOSITIONS

Jeremy Musher, New York, N.Y., and Kai Su, Rutherford, N.J., assignors to Evelyn Musher, New York, N.Y.

Division of Ser. No. 229,499, Feb. 25, 1972, Pat. No. 3,939,190.
This application Dec. 5, 1975, Ser. No. 637,972
Int. Cl.² C08F 136/02; C08G 18/42, 18/48, 63/68
U.S. Cl. 260—77.5 CH 11 Claims

1. An interpolymeric compound which includes polyolefin, polyether, polyester, polyurethane, polyurea or polyamide and

which includes in its structure a plurality of units having the molecular formula:

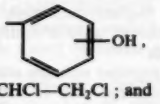


wherein:

a. A is a phenyl moiety of a lower alkyl moiety up to C_5;

b. D' is a connecting group which has undergone either condensation or addition reactions with compatible functional groups of other compounds and was selected from the group consisting of

wherein Y is selected from the group consisting of —H, $-CH_3$, $-CH_2CH_2OH$,



—CH=CH_2, and —CHCl—CH_2Cl ; and

c. E' is any of D' or

herein.

4,052,370

ALKALI METAL ALIPHATIC AND AROMATIC HYDROCARBON ACETALS AND KETALS AND THEIR USE AS POLYMERIZATION INITIATORS

Adel Farhan Halasa, Bath, and Donald Norman Schulz, Hartville, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 314,876, Dec. 13, 1972, Pat. No. 3,862,100. This application Aug. 19, 1974, Ser. No. 498,838

Int. Cl.² C08G *18/62*

U.S. Cl. 260—77.5 CR **11 Claims**

1. The process of producing an hydroxy polymeric material having the formula

HO.R.P.R'.OH

which comprises reacting a material of the formula

Acetal or Ketal-R-P-Li

with an expoxide and obtaining a polymeric material of the formula

Acetal or Ketal-R-P-R'-OH

and thereafter hydrolyzing the acetal or ketal group with an acid medium and producing a compound of the formula

HO.R.P.R'.OH

in which (a) R stands for a straight-chain or branched-chain or cyclo-alkylene group of 1 to 20 carbon atoms or phenylene or alkyl phenylene in which each alkyl group contains 1 to 3 carbon atoms, (b) P stands for a homopolymer or copolymer of a conjugated diene containing 4 to 6 carbon atoms, or a homopolymer of a vinyl monomer, or a copolymer of such a diene and a vinyl monomer, (c) R' is different from R and is the residue left from the epoxide used in the hydroxylation and (d) the acetal or ketal is a hydrocarbon aliphatic or aromatic acetal or ketal and is an hydroxyl carrier.

4,052,371

AZO PIGMENT OR DYE HAVING A NAPHTHYL-QUINAZALONE COUPLING COMPONENT

Helmut Junge, Wachenheim, and Walter Kurtz, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

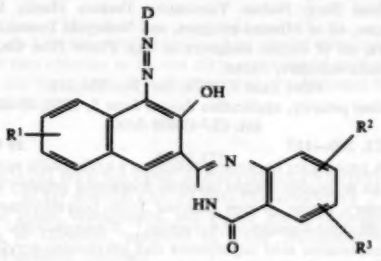
Filed June 21, 1976, Ser. No. 697,772

Claims priority, application Germany, July 16, 1975, 2531714

Int. Cl.² C09B *29/20, 29/22;* D06P *1/04, 3/34*

U.S. Cl. 260—154 **4 Claims**

1. A compound of the formula



in which

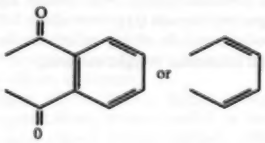
D is phenyl substituted by fluoro, chloro, bromo, trifluoromethyl, nitro, cyano, C_1 to C_4 alkylsulfonyl, phenylsulfonyl, methoxy, ethoxy, methyl, ethyl, C_1 to C_4 alkoxycarbonyl, carbamoyl, N-methylcarbamoyl, N-phenylcarbamoyl, sulfamoyl or phenylazo; 3- or 4-phthalimidyl, 3- or 4-phthalimidyl substituted on the nitrogen by phenyl, chlorophenyl, methylphenyl or methoxyphenyl; 1- or 2-anthraquinonyl; 2-chloroanthraquinonyl-1; or 3-chloro- or 3-bromoanthraquinonyl-2;

R^1 is hydrogen, chloro, bromo, methoxy or ethoxy;

R^2 is hydrogen, chloro, bromo, methyl, ethyl, trifluoromethyl, nitro, methylsulfonyl, ethylsulfonyl, phenylsulfonyl, carbamoyl, N-phenylcarbamoyl, sulfamoyl, N-phenylsulfamoyl, C_1 to C_4 alkoxycarbonyl, benzoylamino or phthalimidyl;

R^3 is hydrogen, chloro, bromo or nitro; and

R^2 and R^3 together are



4,052,372

PREPARATION OF ε-(γ-GLUTAMYL)-LYSINE

Paul-Andre Finot, Vevey; Pierre Hirsbrunner, Corseaux, and Raymond Bertholet, Aigle, all of Switzerland, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Jan. 30, 1976, Ser. No. 653,704

Claims priority, application Switzerland, Feb. 7, 1975, 1536/75

Int. Cl.² C07C *103/52*

U.S. Cl. 260—112.5 R **9 Claims**

1. A process for the preparation of ε-(γ-glutamyl)-lysine

which comprises heating lysine glutamate for at least 5 hours at a temperature of at least 120° C in a heat-carrier fluid which is (a) immiscible with lysine glutamate, (b) chemically inert to lysine glutamate and (c) possesses a boiling point above 120° C., and isolating ϵ-(γ-glutamyl)-lysine from the conversion product thus obtained.

4,052,373

PROCESS FOR HARDENING GELATIN

Hidefumi Sera; Nobuo Yamamoto; Ikutaro Horie; Kameji Nagao, all of Minami-ashigara, and Nobuyuki Iwasaki, Fujimiya, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 5, 1975, Ser. No. 584,231

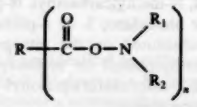
Claims priority, application Japan, June 5, 1974, 49-63731

Int. Cl.² C09H 5/00

U.S. Cl. 260—117 **16 Claims**

1. A process for hardening gelatin or a hydrophilic non-gelatin high molecular weight material containing primary and/or secondary amino groups selected from polyethyleneamine, poly(ethylene-4-amino-1,2,4-triazole, β-aminoacrylic acid-ethylene-maleic acid copolymers and vinylamine-acrylic acid copolymers which comprises adding to the gelatin or the high molecular weight material a compound represented by the following general formula (I):

(I)



wherein R_1 and R_2, which may be the same or different, each represents a monovalent residue which is bended through a carbon atom or a sulfur atom thereof to the nitrogen atom forming the carboxylic acid ester, and R_1 and R_2 may combine to form a ring structure; R is a divalent or trivalent residue which is bonded through a carbon atom or a nitrogen atom thereof to the carbon atom of the carboxyl group in the carboxylic acid ester; and n is 2 when R is a divalent residue and n is 3 when R is a trivalent residue, wherein the amount of said compound of general formula (I) is from about 0.1% to 10% be weight based on the weight of dry gelatin or the hydrophilic non-gelatin high molecular weight material.

4,052,374

UNSYMMETRICAL 1:2-CHROMIUM COMPLEXES CONTAINING AN AZO COMPOUND AND AN AZOMETHINE COMPOUND

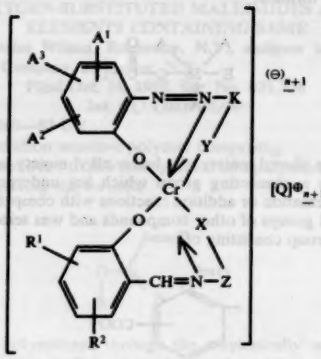
Hans Baumann, Ludwigshafen, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Dec. 8, 1975, Ser. No. 638,959

Int. Cl.² C09B 45/02, 45/06, 45/16, 45/38

U.S. Cl. 260—145 A **6 Claims**

1. A dye of the formula:



in which

A^1 is hydrogen, hydroxysulfonyl, chloro, bromo, methyl, methoxy, ethoxy, nitro, methylsulfonyl, ethylsulfonyl, sulfamoyl, an N-mono-C_1-C_4-alkyl or N,N-di-C_1C_4-alkyl substituted sulfamoyl, or N-phenylsulfamoyl;

A^2 is hydrogen, chloro, nitro or hydroxysulfonyl;

A^3 is hydrogen; or

A^1 and A^3 taken together with the attached phenylene moiety form naphthalene with or without a fused benzene ring nitro as a substituent;

R^1 is hydrogen, chloro, bromo, nitro, hydroxysulfonyl, phenylazo with or without chloro, bromo, methyl, methoxy, ethoxy, nitro or hydroxysulfonyl as a substituent or naphthylazo with or without hydroxysulfonyl as a substituent;

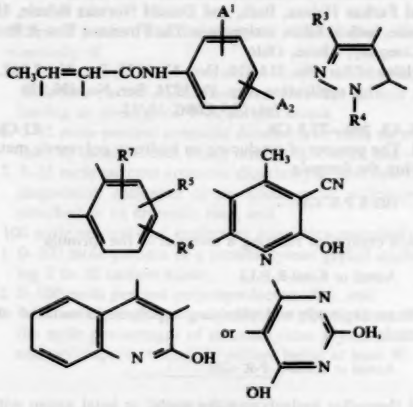
R^2 is hydrogen, chloro, bromo or nitro; or

R^1 and R^2 together with the attached phenylene moiety form naphthalene;

X is —O— or —COO—;

Y is —O— or —NH—;

K is



R^3 is hydrogen, methyl, phenyl or carbamoyl;

R^4 is hydrogen or phenyl with or without methyl, chloro or hydroxysulfonyl as a substituent;

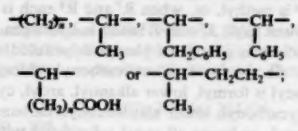
R^5 is methyl, methoxy, acetylamino, propionylamino, benzoylamino, N-phenylamino, dimethylamino or diethylamino;

R^6 is hydrogen or methyl;

R^7 is hydrogen or, when R^5 and R^6 taken together with the attached phenylene moiety form naphthalene with or without bromo, amino, hydroxy, phenylamino,

acetylamino, propionylamino, benzoylamino or hydroxysulfonyl as a substituent, R^7 is hydrogen or hydroxysulfonyl;

Z is



Q is a cation; and

n is one of the integers 1, 2 and 3.

4,052,375

WATER-SOLUBLE TRISAZOSULFONATED DYESTUFF DERIVED FROM 2-AMINOPHENOL-4-SULFONIC ACID, RESORCINOL, 4,4'-DIAMINOBENZANILIDE AND M-AMINOPHENOL

Sisto Sergio Papa, and Antonino Condo, both of Milan, Italy, assignors to Aziende Colori Nazionali Affini ACNA S.p.A., Milan, Italy

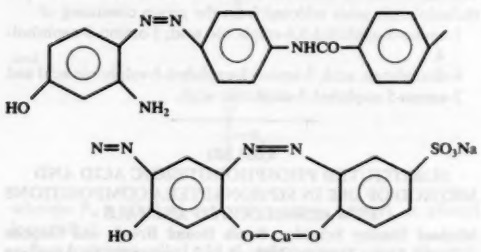
Continuation-in-part of Ser. No. 542,937, Jan. 22, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,117

Claims priority, application Italy, Jan. 30, 1974, 19964/74

Int. Cl.[2] C09B *45/28*

U.S. Cl. 260—145 C **1 Claim**

1. A water-soluble triazo sulfonated dyestuff having the formula:



4,052,376

MIXED CHROMIFEROUS COMPLEX DERIVED FROM TWO DIFFERENT ARYL-AZO-PYRAZOLONE DYESTUFF

Antoine Georges Leon Jacques Breda, Boisguillaume, and Claude Marie Henri Emile Brouard, Sotteville les Rouen, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Jan. 31, 1975, Ser. No. 546,155

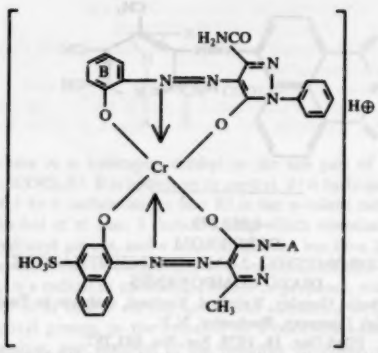
Claims priority, application France, Feb. 6, 1974, 74.03912

Int. Cl.[2] C09B *45/06, 45/16, 45/48;* D06P *3/24*

U.S. Cl. 260—145 B **2 Claims**

1. Chromiferous complex dyestuff having, in the free acid form, the following formula:

(I)



in which A is unsubstituted phenyl or phenyl substituted by one or two chlorine or by one alkyl containing 1 to 4 carbon atoms and the nucleus B is unsubstituted or substituted by one or two chlorine.

4,052,377

MONOAZO DYE HAVING A β-HYDROXYNAPHTHOIC ACID AMIDE COUPLING COMPONENT

Helmut Junge, Wachenheim, and Walter Kurtz, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

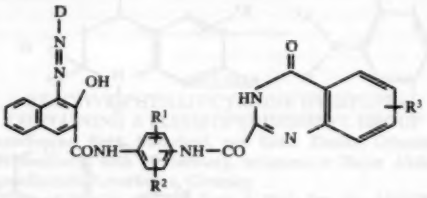
Filed Apr. 28, 1976, Ser. No. 680,918

Claims priority, application Germany, May 10, 1975, 2520896

Int. Cl.[2] C09B *29/20, 29/22;* D06P *1/44, 1/52*

U.S. Cl. 260—154 **6 Claims**

1. A dye of the formula



in which

D is phenyl substituted by fluoro, chloro, bromo, trifluoromethyl, methyl, ethyl, methoxy, ethoxy, C_1- to C_4-alkoxycarbonyl, cyano or nitro; phthalimidyl; phthalimidyl substituted at the nitrogen by methyl, ethyl, phenyl or phenyl substituted by chloro, bromo,methyl, ethyl, methoxy or ethoxy; anthraquinonyl; or anthraquinonyl substituted by chloro or bromo;

R^1 is hydrogen, chloro, bromo, methyl or methoxy,

R^2 is hydrogen, chloro, bromo, methyl or methoxy and

R^3 is hydrogen, chloro, bromo, methyl, trifluoromethyl or nitro.

4,052,378

RED PIGMENT OBTAINED BY COUPLING DIAZOTIZED 4-AMINONAPHTHALIMIDE WITH 2,6-DIHYDROXY-3-CYANO-4-METHYLPYRIDINE

Leonhard Heckl, Besigheim; Egon Liedek, Esslingen-Sulzgries, and Wolfgang Ruff, Stuttgart-Rohracker, all of Germany, assignors to BASF Farben + Fasern AG, Hamburg, Germany

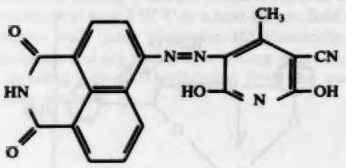
Filed Jan. 21, 1976, Ser. No. 651,072

Claims priority, application Germany, Jan. 30, 1975, 2503732

Int. Cl.[2] C09B *29/36;* C09D *11/00;* D06P *1/04, 1/44*

U.S. Cl. 260—155 **1 Claim**

1. The compound of the formula



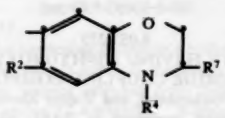
4,052,379

DYES FROM TRIFLUOROMETHYL-2-AMINOBENZOTHIAZOLE DIAZO COMPONENTS

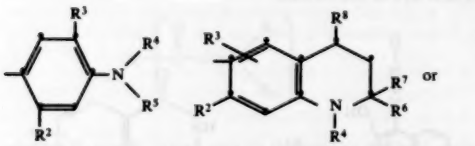
Robert Nicholas Gourley, Rainford, England, assignor to Eastman Kodak Company, Rochester, N.Y.

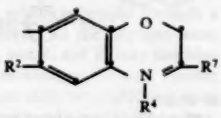
Filed Dec. 18, 1975, Ser. No. 641,787
Int. Cl.[2] C09B *29/08, 29/26, 29/36;* D06P *1/18*
U.S. Cl. 260—155 12 Claims

1. A disperse diazo compound having the formula:

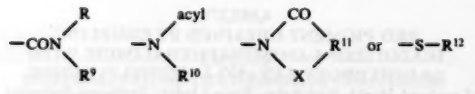


wherein R^1 is a substituent selected from the group consisting of hydrogen, methyl, ethyl, methoxy, ethoxy, halogen, nitro, acetyl, carboalkoxy, cyano, the thiocyanato, and A is a group having the formula:





wherein R^2 is hydrogen, lower alkyl, lower alkoxy, trifluoromethyl, halogen, or a group having the formula —NH-acyl; R^3 is hydrogen, lower alkyl or lower alkoxy; R^4 individually is alkyl containing one to eight carbon atoms; cyclohexyl; cyclohexyl substituted with lower alkyl; or lower alkyl substituted with lower alkoxy, aryl, aryloxy, cyclohexyl, cyano, hydroxy, lower alkanoyloxy, methylsulfonyl, lower alkoxycarbonyl, lower alkoxycarbonyloxy, aroyloxy, lower alkylcarbamoyloxy, arylcarbamoyloxy, or a group having the formula:



wherein R individually is hydrogen, lower alkyl or aryl; R^9 individually is hydrogen or lower alkyl; R and R^9 collectively are $-(CH_2)_5-$ or $-CH_2CH_2OCH_2CH_2-$; R^{10} is hydrogen, lower alkyl, aryl or cyclohexyl; R^{11} is ethylene, propylene, trimethylene, o-cyclohexylene, or o-arylene; X is $-CH_2-$, —CO—, or $-SO_2-$; and R^{12} is aryl, benzyl, cyclohexyl, 1,2,4-triazol-3-yl, or 2-benzothiazolyl; R^5 individually is hydrogen, lower alkyl, lower alkyl substituted with hydroxy, cyano, lower alkoxy, aryl, aryloxy, cyclohexyl, lower alkanoyloxy, lower alkoxycarbonyl or lower alkoxycarbonyloxy; or aryl; R^4 and R^5 in combination is a group having the formula $-CH_2CH_2-Y-CH_2CH_2-$ in which Y is $-CH_2-$, —O—, or $-SO_2-$; R^6 is methyl, or, when R^7 and R^8 each is hydrogen, R^6 can be lower akyl; R^7 and R^8 each is hydrogen or methyl; each aryl moiety is phenyl or phenyl substituted with lower alkyl, lower alkoxy, lower alkoxycarbonyl, chlorine or bromine; each acyl is formyl, lower alkanoyl, aroyl, cyclohexoyl, lower alkoxycarbonyl, lower alkylsulfonyl, carbamoyl, lower alkylcarbamoyl, or lower alkanoyl substituted with chlorine, hydroxy, aryl, cyano, lower alkoxy or aryloxy, or benzyloxy.

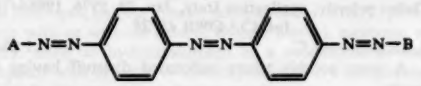
4,052,380

TRISAZO DYES CONTAINING TWO DIFFERENT AMINONAPHTHOLSULPHONIC ACID COUPLER COMPONENTS

Ermanno Gaetani, Milan, and Sandro Ponzini, Saronno (Varese), both of Italy, assignors to Aziende Colori Nazionali Affini ACNA S.p.A., Milan, Italy

Continuation of Ser. No. 414,832, Nov. 12, 1973, abandoned.
This application Apr. 11, 1975, Ser. No. 588,400
Claims priority, application Italy, Nov. 10, 1972, 31513/72
Int. Cl.[2] C09B *35/04*
U.S. Cl. 260—169 3 Claims

1. A direct dye diazotizable on fibers and having the formula:



wherein A and B, different from each other, are amino-naphtholsulphonic acids selected from the group consisting of 1-amino-8-naphthol-3,6-sulphonic acid; 1-amino-8-naphthol-4,
6-disulphonic acid; 2-amino-8-naphthol-6-sulphonic acid and 2-amino-5-naphthol-7-sulphonic acid.

4,052,381

SUBSTITUTED PHOSPHOROTHIOIC ACID AND METHOD OF USE IN SIPHONAPTERA COMPOSITIONS IN WARM-BLOODED ANIMALS

Michael Stanley Schrider, South Bound Brook, and Stephen David Levy, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 21, 1975, Ser. No. 570,295
Int. Cl.[2] C07C *107/06*
U.S. Cl. 260—206 1 Claim

1. The compound phosphorothioic acid, O,O'-azodi-p-phenylene O,O,O',O' tetramethyl ester, trans.

4,052,382

1-PHENYL-3-AZACARBOCYCLIC-UREAS

Guy D. Diana, Stephentown, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 536,755, Dec. 27, 1974, Pat. No. 3,963,748, which is a continuation-in-part of Ser. No. 266,695, June 27, 1972, abandoned, which is a division of Ser. No. 82,799, Oct. 21, 1970, Pat. No. 3,717,648, which is a continuation-in-part of Ser. No. 733,323, May 31, 1968, abandoned. This application Nov. 19, 1975, Ser. No. 633,444
Int. Cl.[2] C07D *207/22, 211/72, 233/04*
U.S. Cl. 260—239 BE 2 Claims

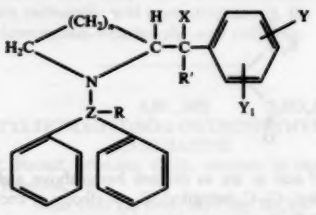
1. 1-(4-Chlorophenyl)-3-(3,4,5,6-tetrahydro-2H-azepin-7-yl)urea or pharmaceutically acceptable acid-addition salts thereof.

4,052,383
N-DIPHENYLALKYL-2-BENZYL AZACYCLIC COMPOUNDS

Elijah H. Gold, West Orange, and Daniel M. Solomon, Edison, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 519,396, Oct. 30, 1974, abandoned. This application Mar. 8, 1976, Ser. No. 664,607
Claims priority, application Switzerland, Oct. 24, 1975, 13915/75
Int. Cl.² C07D 205/04, 207/06
U.S. Cl. 260—239 A 17 Claims

1. A compound of the formula



(I)

wherein

n is an integer from 1 to 5;

R and R′ are independently selected from the group consisting of hydrogen and alkyl of 1–4 carbon atoms;

X is selected from the group consisting of hydrogen, OR_2 and NR_1R_3;

R_1 is hydrogen, alkyl of 1–4 carbon atoms, phenyl lower alkyl,

and

wherein R_4 is alkyl of 1–4 carbon atoms, phenyl, or phenyl lower alkyl.

R_2 is hydrogen, alkyl of 1–4 carbon atoms, lower alkanoyl, benzoyl or pheyl alkyl of 1–4 carbon atoms;

R_3 is hydrogen, alkyl of 1–4 carbon atoms and phenyl lower alkyl;

Y and Y_1 are independently selected from the group consisting of hydrogen, halogen, hydroxy, lower alkoxy and trifluoromethyl;

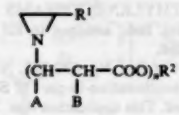
Z is a C_1–C_2 alkylene group, and the pharmaceutically acceptable salts thereof.

4,052,384
MANUFACTURE OF AZIRIDINOCARBOXYLIC ACID ESTERS

Toni Dockner, Meckenheim; Albrecht Wallis; Rolf Fikentscher, both of Ludwigshafen; Rainer Thomas, Frankenthal, and Reinhard Herzog, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Apr. 13, 1976, Ser. No. 676,573
Claims priority, application Germany, May 16, 1975, 2521859
Int. Cl.² C07D 203/18, 295/14
U.S. Cl. 260—239 E 5 Claims

1. An improved process for the manufacture of aziridinocarboxylic acid esters of the general formula



(I)

where A is hydrogen, methyl or the nth part of the group $(—COO)_nR^2$, B is hydrogen or methyl, R^1 is hydrogen or alkyl of 1 to 5 carbon atoms and R^2 is the n-valent radical of an alcohol of at least 2 carbon atoms which contains at least n hydroxyl groups, and n is an integer not less than 2, by transesterification of compounds of the general formula (I), where R^2 is a radical of methanol, ethanol or propanol, with an alcohol of at least 2 carbon atoms and containing at least n hydroxyl groups, in the presence of a basic trans-esterification catalyst, and removal of the resulting methanol, ethanol or propanol from the esterification equilibrium by distillation, wherein the improvement comprises using magnesium oxide or calcium oxide as the trans-esterification catalyst.

4,052,385
CERTAIN N-(2-HYDROXYETHYL)HETEROIMINOCARBOXAMIDES

Norton P. Peet, and Shyam Sunder, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 21, 1975, Ser. No. 624,365
Int. Cl.² C07D 207/16, 211/16, 223/04, 295/20
U.S. Cl. 260—239 BF 6 Claims

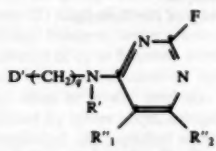
1. The compound N-(2-hydroxypropyl)-1-pyrrolidinecarboxamide.

4,052,386
REACTIVE PHTHALOCYANINE DYESTUFFS CONTAINING A FLUOROPYRIMIDINYL GROUP

Hans-Samuel Bein, Burscheid, and Erich Klauke, Odenthal-Hahnenberg, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 664,943, Sept. 1, 1967, Pat. No. 3,669,951. This application June 3, 1971, Ser. No. 149,769
Claims priority, application Germany, Sept. 10, 1966, F 50181; Mar. 25, 1967, F 51942
Int. Cl.² C09B 62/26, 47/04
U.S. Cl. 260—242.2 5 Claims

1. A reactive dyestuff having the formula



wherein D′ stands for a sulphonic acid group containing phthalocyanine dyestuff, q stands for the number 0 or 1, R′ stands for hydrogen, $—CH_3$ or $—C_2H_5$, R''_1 stands for Cl or F, R''_2 stands for Cl, F or CH_3, and F stands for fluoro, the group

being bound to an aromatic carbocyclic carbon atom of D′.

4,052,387

METHOD OF PREPARATION OF 3-METHYLENECEPHAMS

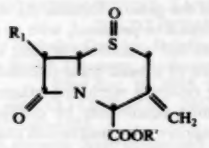
Stjepav Kukolja, Carmel, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 632,733, Nov. 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 536,280, Dec. 24, 1974, abandoned. This application Apr. 2, 1976, Ser. No. 673,036

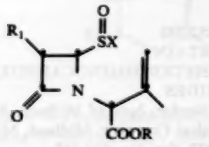
Int. Cl.[2] C07D *501/02*

U.S. Cl. 544—22 35 Claims

1. The process for preparing a 3-methylenecepham sulfoxide of the formula



by reacting a compound of the formula

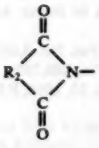


with a Lewis acid type Friedel-Crafts catalyst, a Bronsted proton acid type Friedel-Crafts catalyst or a metathetic cation-forming agent in a dry inert organic solvent, or dissolving such compound in a Bronsted acid selected from the group consisting of methanesulfonic acid, trifluoromethanesulfonic acid, trifluoroacetic acid, trichloroacetic acid, or dichloroacetic acid; wherein in the above formulae

R is a carboxylic acid protecting group;

R′ is R or hydrogen;

R_1 is (1) an imido group of the formula



wherein R_2 is C_2–C_4 alkenylene, C_2–C_4 alkylene, 1,2-phenylene, 1,2-cyclohexenylene; or

2. an amido group of the formula

wherein R_3 is

a. hydrogen, C_1–C_3 alkyl, halomethyl, cyanomethyl or 3-(2-chlorophenyl)-5-methylisoxazol-4-yl;

b. benzyloxy, 4-nitrobenzyloxy, 2,2,2-trichloroethoxy, tert-butoxy, or 4-methoxybenzyloxy;

c. the group R″ wherein R″ is phenyl or phenyl substituted with 1 or 2 substituents independently selected from the group consisting of halo, protected hydroxy, nitro, cyano, trifluoromethyl, C_1–C_3 alkyl, and C_1–C_4 alkoxy;

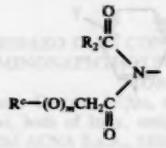
d. an arylalkyl group of the formula

wherein R^o is R″ as defined above, 2-thienyl, 3-thienyl or 1,4-cyclohexadienyl, *m* is 0 or 1, and Q is O or S subject to the limitation that when *m* is 1, R^o is R″;

e. a substituted arylalkyl group of the formula

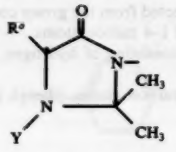
wherein R^o is as defined above and W is protected hydroxy or protected amino;

3. an imido group of the formula



wherein R^o and m are as defined hereinabove and R_2′ is C_1–C_3 alkyl, C_1–C_6 haloalkyl, C_1–C_3 alkoxy or trichloroethoxy; or R_1 is

4. an imidazolidinyl group of the formula



wherein R^o is as defined above and Y is acetyl or nitroso; and X is

1. chloro or bromo;

2. a group of the formula —OR_4 wherein R_4 is hydrogen, C_1–C_{10} alkyl, aryl (C_1–C_3 alkyl) or C_1–C_6 haloalkyl;

3. a group of the formula -SR_5 wherein R_5 is C_1–C_6 alkyl, aryl or aryl (C_1–C_3 alkyl); or

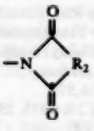
4. a group of the formula

wherein

a. R_6 is hydrogen and R_7 is hydrogen, R″ is as defined hereinabove, or a group of the formula —NHR_8 wherein R_8 is aminocarbonyl, C_1–C_3 alkylaminocarbonyl, C_1–C_3 alkylcarbonyl, C_1–C_3 alkoxycarbonyl or tosyl;

b. R_6 is —$COOR_9$ or —COR_9 and R_7 is —$NHCOOR_9$ or —$NHCOR_9$ wherein R_9 is C_1–C_6 alkyl or phenyl; or wherein

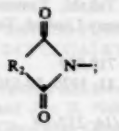
c. R_6, R_7 and the nitrogen atom to which they are bonded taken together form an imido group of the formula



wherein R_2 is as defined hereinabove; and when R6 is —$COOR_9$ or —COR_9 and R_7 is —$NHCOOR_9$ or —$NHCOR_9$, R_3 is additionally a heteroarylmethyl group of

the formula R""CH_2— wherein R"" is 2-furyl, 3-furyl, 2-thiazolyl or 5-isoxazolyl;

with the limitations that when X is bromo, R_1 is only an imido group of the formula



when the cyclizing agent is a metathetic caton-forming agent or a Lewis acid, X is only chloro or bromo; and when R is an acid labile carboxylic acid protecting group, the product is a 3-methylenecepham-4-carboxylic acid sulfoxide.

4,0[illegible],388

3-ACETYLTETRAHYDRO-2-(NITROMETHYLENE)-2H-1,3-THIAZINE

James E. Powell, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 12, 1976, Ser. No. 731,147

Int. Cl.[2] C07D *279/06*

U.S. Cl. 544—54 **1 Claim**

1. 3-acetyltetrahydro-2-(nitromethylene)-2H-1,3-thiazine.

4,052,389

DERIVATIVES OF 9,10-DIHYDROXY-1-(p-ALKOXYBENZYL)-PERHYDROISOQUINOLINE OXAZINE-3-ONE

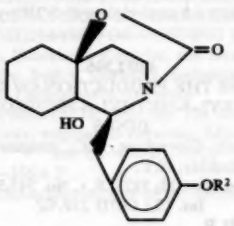
Ivo Monkovic, Candiac; Carol Bachand, Cote Ste-Catherine, and Henry Wong, Candiac, all of Canada, assignors to Bristol-Myers Company, New York, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,540

Int. Cl.[2] C07D *265/00, 273/00, 295/00*

U.S. Cl. 544—89 **2 Claims**

1. A compound having the formula



in which R^2 is loweralkyl.

4,052,390

AZAPURINONES

Barbara Joyce Broughton, Croydon; Bryan John Large, Ilkley; Stuart Malcolm Marshall, Stanford-le-Hope; David Lord Pain, Upminster, and Kenneth Robert Harry Wooldridge, Brentwood, all of England, assignors to May & Baker Limited, England

Division of Ser. No. 478,387, June 11, 1974, Pat. No. 3,933,822.

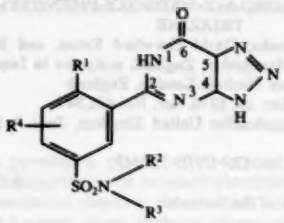
This application May 6, 1975, Ser. No. 574,870

Claims priority, application United Kingdom, June 12, 1973, 27920/73

Int. Cl.[2] C07D *487/04*; A61K *31/505*

U.S. Cl. 544—118 **5 Claims**

1. An 8-azapurin-6-one of the formula:



wherein R^1 represents a member selected from the class consisting of hydroxy, alkoxy of 1 to 10 carbon atoms, and alkylthio of 1 to 10 carbon atoms, the group NR^2R^3 represents piperidino, 1-pyrrolidinyl, or morpholino, and R^4 represents hydrogen, methyl or ethyl, or a pharmaceutically acceptable salt thereof.

4,052,391

3-(DISUBSTITUTED)AMINOISOTHIAZOLO[3,4-d]PYRIMIDINES

Yoshiyasu Furukawa, and Osamu Miyashita, both of Osaka, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 522,863, Nov. 11, 1974, Pat. No. 3,959,280.

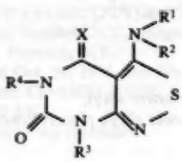
This application Mar. 3, 1976, Ser. No. 663,227

Claims priority, application Japan, Nov. 12, 1973, 48-127050

Int. Cl.[2] C07D *513/04*

U.S. Cl. 544—117 **8 Claims**

1. A compound selected from the group consisting of a compound of the formula



wherein

R^1 and R^2, together with the adjacent nitrogen atom, form a piperazine, morpholine, pyrrole, pyrrolidine or 4-formylpiperazine-1-yl ring,

R^3 is selected from the group consisting of (1) alkyl of up to 5 carbon atoms, (2) alkyl of up to 5 carbon atoms, substituted by hydroxy, halogen, lower alkoxy, nitro or lower acyloxy, (3) alkenyl of up to 5 carbon atoms, (4) alkenyl of up to 5 carbon atoms, substituted by hydroxy, halogen, lower alkoxy, nitro or lower acyloxy, (5) phenyl, (6) phenyl substituted by lower alkyl, halogen, lower alkoxy or nitro, (7) naphthyl, (8) naphthyl substituted by lower alkyl, halogen, lower alkoxy or nitro, (9) aralkyl of 7–11 carbon atoms, (10) aralkyl of 7–11 carbon atoms, substituted by lower alkyl, halogen, lower alkoxy or nitro, (11) aralkenyl of 7–11 carbon atoms and (12) aralkenyl of 7–11 carbon atoms substituted by lower alkyl, halogen, lower alkoxy or nitro,

R^4 is hydrogen or alkyl of up to 5 carbon atoms, and

X is oxygen or imino, a pharmaceutically acceptable salt of said compound, a tautomer of said compound, and a pharmaceutically acceptable salt of said tautomer,

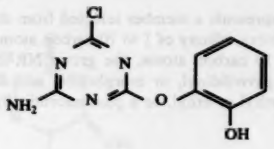
with the proviso that when X is imino R^4 is hydrogen.

4,052,392
2-AMINO-4-CHLORO-6-(2'-HYDROXY-PHENOXY)-S-TRIAZINE

John Langshaw Brooks; David Crawford Eaton, and Barry Williams, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 29, 1976, Ser. No. 671,547
Claims priority, application United Kingdom, June 3, 1975, 23922/75
Int. Cl.² C07D *251/42*
U.S. Cl. 544—211 1 Claim

1. The compound of the formula:

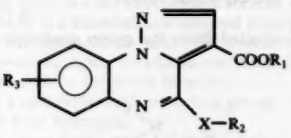


4,052,393
4-SUBSTITUTED DERIVATIVES OF PYRAZOLO [1,5-a]-QUINOXALINE-3-CARBOXYLIC ACIDS AND ESTERS

Uwe D. Treuner, Regensburg, Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 628,277, Nov. 3, 1975, Pat. No. 3,994,893. This application Mar. 22, 1976, Ser. No. 669,114
Int. Cl.² C07D *487/04*; A61K *31/495*
U.S. Cl. 260—250 Q 12 Claims

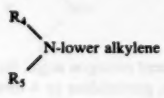
1. A compound of the formula



wherein

R_1 is hydrogen or lower alkyl;

R_2 is hydrogen, lower alkyl, phenyl-lower alkylene or



wherein

R_4 and R_5 each is hydrogen or lower alkyl or together with the nitrogen complete one of the heterocyclics pyrrolidion, piperidino, said heterocyclics being unsubstituted or substituted with one or two lower alkyl groups;

R_3 is hydrogen, lower alkyl, halogen or lower alkoxy;

X is oxygen or sulfur;

and salts thereof.

4,052,394
2-(DICYANOMETHYLENE)-1,3-DITHIOLO-(4,5-b)PYRAZINE-5,6-DICARBONITRILE

Craig E. Mixan, and R. Garth Pews, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 24, 1976, Ser. No. 744,485
Int. Cl.² C07D *495/04*
U.S. Cl. 260—250 BC 1 Claim

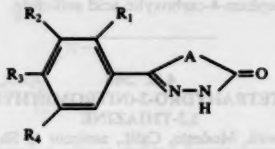
1. 2-(Dicyanomethylene)-1,3-dithiolo(4,5-b)-pyrazine-5,6-dicarbonitrile.

4,052,395
AGRICULTURAL FUNGICIDAL COMPOSITIONS CONTAINING 6-(SUBSTITUTED PHENYL)-PYRIDAZINONES AND SAID PYRIDAZINONES

Teruomi Jojima, Tokyo, and Yukiyoshi Takahi, Yasumachi, both of Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Aug. 30, 1976, Ser. No. 718,589
Claims priority, application Japan, Sept. 11, 1975, 50-110331; Apr. 1, 1976, 51-36453
Int. Cl.² A61K *31/50*; C07D *237/14, 237/04*
U.S. Cl. 424—250 24 Claims

1. An agricultural fungicidal composition which comprises as an active ingredient a compound having the formula



wherein

R_1 is hydrogen atom, hydroxy group, a group of the formula —O—CO—R_5 in which R_5 is an alkyl group of 1–5 carbon atoms or a group of the formula —O—SO_2—R_6 in which R_6 is a phenyl group optionally substituted with a halogen atom or an alkyl group of 1 – 3 carbon atoms;

R_2 and R_4 may be the same or different and each represents halogen atom or one of R_2 and R_4 is a halogen atom and the other is hydrogen atom;

R_3 is hydrogen atom, an alkyl group of 1 – 6 carbon atoms, an alkoxy group of 1 – 6 carbon atoms, an alkenyloxy group of 3 – 5 carbon atoms, an alkynyloxy group of 3 – 4 carbon atoms, amino group, hydroxy group, a halogen atom, a group of the formula —O—CO—R_5 in which R_5 is as defined above or a group of the formula —O—SO_2—R_6 in which R_6 is as defined above; and

A is a group of —CH_2—CH_2— or —CH=CH— or a salt thereof where A is the group—CH=CH—

and an agriculturally acceptable carrier.

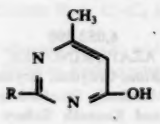
16. 6-(3,5-Dichloro-4-methylphenyl)-3(2H)pyridazinone.

4,052,396
PROCESS FOR THE PRODUCTION OF 2-ALKYL OR 2-CYCLOALKYL-4-METHYL-6-HYDROXYPYRIMIDINES

Joseph R. Pociask, Greensboro, N.C., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 22, 1976, Ser. No. 743,555
Int. Cl.² C07D *239/02*
U.S. Cl. 260—251 R 8 Claims

1. A process for the preparation of 2-alkyl or 2-cycloalkyl-4-methyl-6-hydroxypyrimidine of the formula



wherein R represents alkyl of 1 to 4 carbon atoms and cycloalkyl of 3 to 6 carbon atoms, which comprises

1. reacting diketene and a nitrile of the formula

RCN

wherein R has the same meaning as given above, in an organic solvent at a temperature ranging from about 20° C to 150° C and in the presence of a catalytic amount of a Lewis or Bronsted, acid, and

2. reacting the reaction product obtained in the first step with ammonia in an organic solvent at a temperature ranging from about 80° to 150° C and in the presence or absence of a Bronsted acid.

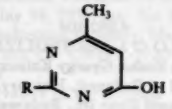
4,052,397

PROCESS FOR THE PRODUCTION OF 2-ALKYL OR 2-CYCLOALKYL-4-METHYL-6-HYDROXYPYRIMIDINES

J. Thomas Blackwell, Greensboro; John T. Gupton, Jamestown, and Jim B. Nabors, Greensboro, all of N.C., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 22, 1976, Ser. No. 743,556
Int. Cl.² C07D *239/02*
U.S. Cl. 260—251 R **8 Claims**

1. A process for the preparation of a 2-alkyl or 2-cycloalkyl-4-methyl-6-hydroxypyrimidine of the formula



wherein R represents alkyl of 1 to 4 carbon atoms and cycloalkyl of 3 to 6 carbon atoms, which comprises sequentially reacting without isolation of intermediates in an organic solvent

1. diketene and ammonia to form β-aminocrotonamide and
2. said β-aminocrotonamide after removal of the coproduced water, with a lower alkanoic or cycloalkanoic acid ester of the formula

$RCOOR_1$

wherein R represents alkyl of 1 to 4 carbon atoms and cycloalkyl of 3 to 6 carbon atoms and R_1 represents lower alkyl of up to 4 carbon atoms and a metal alkoxide of the formula

MOR_2

wherein M is an alkali metal and R_2 represents lower alkyl of up to 4 carbon atoms.

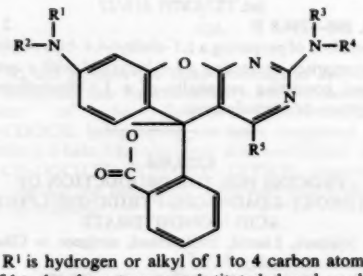
4,052,398

DIAZARHODAMINE-LACTONES, THEIR MANUFACTURE AND THEIR USE AS DYE INTERMEDIATES FOR COPYING PROCESSES

Hellmut Kast, Bobenheim-Roxheim, and Guenter Dunkelmann, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Feb. 13, 1976, Ser. No. 657,861
Claims priority, application Germany, Mar. 6, 1975, 2509793
Int. Cl.² C07D *491/20*
U.S. Cl. 260—256.4 F **6 Claims**

1. A diazarhodamine-lactone of the formula



where R^1 is hydrogen or alkyl of 1 to 4 carbon atoms, R^2 is alkyl of 1 to 4 carbon atoms, unsubstituted phenyl, or phenyl in which 1 or 2 hydrogens are replaced by alkyl of 1 to 3 carbon atoms, chlorine or bromine, the substituents being identical or different, R^3 and R^4 independently of one another are hydrogen, alkyl of 1 to 7 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, phenylalkyl of 7 to 10 carbon atoms or alkoxyalkyl of a total of 3 to 8 carbon atoms, or the group

is a pyrrolidine, piperidine, piperazine, N-methylpiperazine, N-ethylpiperazine or hexamethyleneimine radical, and R^5 is unsubstituted phenyl or phenyl which is substituted by alkyl of 1 to 3 carbon atoms, methoxy, ethoxy, chlorine.

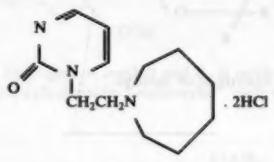
4,052,399

1-[2-(HEXAHYDRO-1H-AZEPINO)ETHYL]-2(1H)PYRIMIDONE DIHYDROCHLORIDE

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Sept. 13, 1976, Ser. No. 722,564
Int. Cl.² C07D *403/06*
U.S. Cl. 260—256.4 C **1 Claim**

1. The compound of the formula:



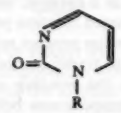
4,052,400

HYPERTENSIVE 1-SUBSTITUTED 2(1H)-PYRIMIDONES

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Oct. 29, 1976, Ser. No. 736,836
Int. Cl.² C07D *401/06, 239/22*
U.S. Cl. 260—256.4 C **3 Claims**

1. A compound of the formula:



Where R is 2-(N-piperidino)ethyl and 1-dimethylaminoisopropyl.

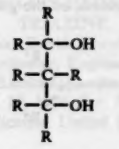
4,052,401

PRODUCTION OF 3-(1',3'-DIOXANE)-PROPIONALDEHYDE COMPOUNDS

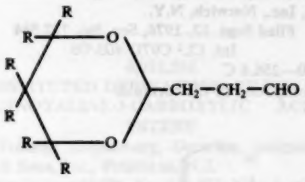
Oscar Richard Hughes, Chatham, N.J., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 640,618, Dec. 15, 1975, Pat. No. 4,003,918.
This application Sept. 7, 1976, Ser. No. 720,788
Int. Cl.² C07D *319/04*
U.S. Cl. 260—340.7 **2 Claims**

1. A process for producing 3-(1',3'-dioxane)-propionaldehyde compounds which comprises (1) forming a liquid feed mixture of acrolein and a diol compound of the formula:



wherein R is hydrogen or methyl; (2) passing the acrolein-diol feed mixture through a fixed bed of perfluoro sulfonic acid cation exchange resin in acid form, at a liquid hourly space velocity between about 0.1 and 50 and a reaction temperature in the range between about 10° C and 60° C, to yield an effluent mixture containing 2-vinyl-1,3-dioxane product; and (3) subjecting the effluent mixture to hydroformylation conditions to produce 3-(1'3'-dioxane)propionaldehyde corresponding to the formula:



wherein R is hydrogen or methyl.

4,052,402

PROCESS FOR SYNTHESIZING CODEINONE FROM THEBAINE

Fernando Calvo, Madrid, Spain, assignor to Fabrica de Productos Quimicos y Farmaceuticos Abello, S.A., Madrid, Spain

Filed Mar. 15, 1976, Ser. No. 666,663

Int. Cl.² C07D *489/00*

U.S. Cl. 260—285 **2 Claims**

1. A process for preparing codeinone, which comprises the steps of: reacting thebaine dissolved in an inert halogenated hydrocarbon solvent, with hydrogen chloride or hydrogen bromide dissolved in an inert alkyl (C_1 to C_4) ether solvent, in the presence of iodine as a catalyst, under anhydrous conditions, to form a halogenated reaction product, then hydrolyzing the halogenated reaction product with an aqueous solution of sodium bicarbonate to transform the halogenated reaction product to codeinone, the reacting and hydrolyzing steps being carried out at temperatures below about 10° C, and recovering codeinone from the product of the hydrolysis step.

4,052,403

2-HYDROXYIMINO-1,2,3,4,6,7-HEXAHYDRO-11bH-BENZO [a] QUINOLISINE DERIVATIVES

Csaba Szantay; Andras Vedres; Karoly Thuranszky; Gyula Balogh, and Maria Vedres nee Kozma, all of Budapest, Hungary, assignors to EGYT Gyogyszervegyeszeti Gyar, Budapest, Hungary

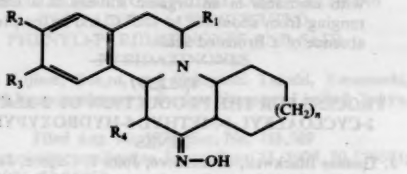
Filed Apr. 21, 1976, Ser. No. 678,902

Claims priority, application Hungary, Apr. 21, 1975, EE 2321

Int. Cl.² C07D *215/42*

U.S. Cl. 260—288 CF **6 Claims**

1. 2-Hydroxyimino-1,2,3,4,6,7-hexahydro-11bH-benzo-[a]-quinolisine derivative of the general formula



wherein R_1 and R_4 are each selected from the group consisting of hydrogen and an alkyl group of 1–4 carbon atoms, R_2 and R_3 are each selected from the group consisting of hydrogen, a hydroxyl group, an alkoxy group of 1–4 carbon atoms and an R_2–R_3 joint methylenedioxy group, and n is an integer from 0–2.

4,052,404

INDOLO (2,3-α)QUINOLIZINES

Csaba Szantay; Lajos Szabo; Gyorgy Kalaus; Egon Karpati, and Laszlo Szporny, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

Filed Nov. 25, 1975, Ser. No. 635,092

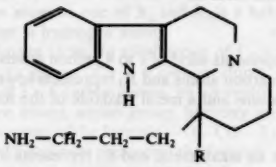
Claims priority, application Hungary, Nov. 26, 1974, RI-555

Int. Cl.² C07D *455/02*

U.S. Cl. 260—293.53 **2 Claims**

1. A compound of the formula (I),

(I)



wherein R stands for alkyl, having from 1 to 6 carbon atoms, or a pharmaceutically acceptable salt thereof or optically active isomer thereof.

4,052,405

MANUFACTURE OF 1,1'-DIALKYL-4,4'-BIPYRIDYLIUM SALTS

John Reginald Case, and Geoffrey James Moore, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed May 7, 1973, Ser. No. 357,656

Claims priority, application United Kingdom, Sept. 4, 1972, 40953/72

Int. Cl.² C07D *213/22*

U.S. Cl. 260—294.8 R **2 Claims**

1. A method of preparing a 1,1'-dialkyl-4,4'-bipyridylium salt which comprises interacting a 4,4'-bipyridyl with a quaternizing agent consisting essentially of a 1,1'-disubstituted-4,4'-bipyridylium di(alkylsulphate).

4,052,406

PROCESS FOR THE PRODUCTION OF 3-HYDROXY-2-IMINO-(2H)-PYRIDINESULPHONIC ACID MONOHYDRATE

Gunter Mattern, Liestal, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 27, 1976, Ser. No. 690,497

Int. Cl.² C07D *213/73*

U.S. Cl. 260—294.8 R **8 Claims**

1. Process for the production of 3-hydroxy-2-imino-1(2H)-pyridinesulphonic acid monohydrate by oxidation of furfurol

and reaction of the oxidation product with sulphamic acid, which process comprises oxidising furfurol in an aqueous medium at a temperature of −10° C to 0° C, with a pH value of 0 to 0.5, in the presence of an oxyacid of tri- or pentavalent phosphorus or of a water-soluble salt of such an acid and with the oxidising agent being chlorine, alkali hypochlorite, bromine, sodium bromate, potassium bromate or chlorine in the presence of hydrogen bromide; subsequently reacting the oxidation product with 2 to 3 moles of sulphamic acid per mole of employed furfurol; and then separating the formed 3-hydroxy-2-imino-1(2H)-pyridinesulphonic acid monohydrate.

4,052,407

THIAZOLE DERIVATIVES AND PROCESSES FOR PREPARING THE SAME

Gabor Ambrus; Istvan Barta; Zsuzsanna Mehesfalvi, nee Vajna, and Gyula Horvath, all of Budapest, Hungary, assignors to Gyogyszerkutato Intezet, Budapest, Hungary

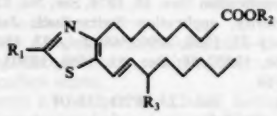
Filed May 14, 1975, Ser. No. 577,348

Claims priority, application Hungary, May 14, 1974, GA 1269

Int. Cl.² C07D *277/20*

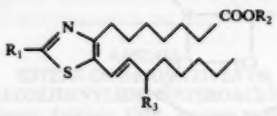
U.S. Cl. 260—302 R **14 Claims**

1. A thiazole derivative of the formula

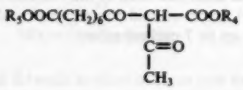


wherein R_1 and R_2 are hydrogen or methyl and R_3 is oxo, hydroxyl or acetoxy.

2. A process for the production of thiazole derivatives of the formula

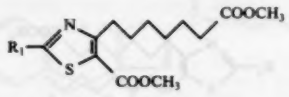


wherein R_1 and R_2 are hydrogen or methyl and R_3 is oxo, hydroxyl or acetoxy, comprising the steps of reacting the sodium derivative of an acetoacetic acid methylester of the formula $CH_3COCH_2COOR_4$ wherein R_4 is methyl, with a 7-carbomethoxyheptanoyl chloride of the formula $R_5OOC(CH_2)_6COCl$, wherein R_5 is methyl, and converting the obtained 10-carbomethoxy-2,4-diketodecane-3-carboxylic acid methylester of the formula

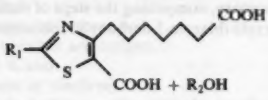


wherein R_4 and R_5 have the same meanings as above, with sodium methylate into 9-carbomethoxy-3-ketononanoic acid methylester of the formula $CH_3OOC(CH_2)_6CO—CH_2—COOCH_3$ halogenating the latter compound to 9-carbomethoxy-2-halo-3-ketononanoic acid methylester of the formula $CH_3OOC(CH_2)_6CO—CHY—COOCH_3$ wherein Y is halogen, reacting the last-named compound with a thioacid amide of the formula

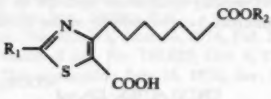
wherein R_1 is hydrogen of methyl, hydrolyzing the obtained 4-(6-carbomethoxyhexyl)-thiazole-5-carboxylic acid methylester of the formula



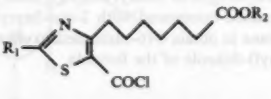
wherein R_1 is hydrogen or methyl, to obtain 4-(6-carboxyhexyl)-thiazole-5-carboxylic acid of the formula



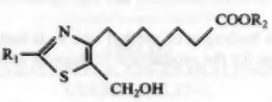
wherein R_1 is hydrogen or methyl, subjecting the last-named compound to selective esterification with an alcohol of the formula R_2OH, wherein R_2 is methyl, in the presence of p-toluenesulphonic acid, converting the thus-obtained 4-(6-carbomethoxyhexyl)-thiazole-5-carboxylic acid of the formula



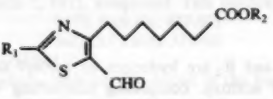
wherein R_1 is hydrogen or methyl and R_2 is methyl, into 4-(6-carbomethoxyhexyl)-thiazole-5-carboxylic chloride of the formula



wherein R_1 is hydrogen or methyl and R_2 is methyl, reducing the last-named compound with an alkali metal borohydride to 4-(6-carbomethoxyhexyl)-5-hydroxy-methyl-thiazole of the formula



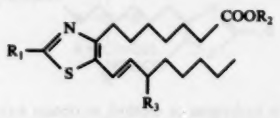
wherein R_1 is hydrogen or methyl and R_2 is methyl, then oxidizing the last-named compound to 4-(6-carbomethoxyhexyl)-thiazole-5-carbaldehyde of the formula



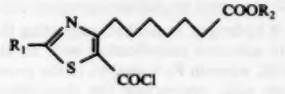
wherein R_1 is hydrogen or methyl and R_2 is methyl, reacting the last-named compound with 2-oxo-heptylidene-triphenyl phosphorane to obtain 4-(6-carbomethoxyhexyl)-5-(3-keto-1-trans-octenyl)-thiazole of the formula

wherein R_1 is hydrogen or methyl and R_2 is methyl.

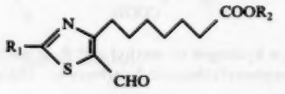
3. A process for the production of thiazole derivatives of the formula



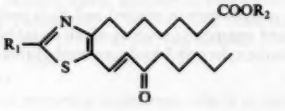
wherein R_1 and R_2 are hydrogen or methyl and R_3 is oxo, hydroxyl or acetoxy, comprising the steps of reducing 4-(6-carbomethoxyhexyl)-thiazole-5-carboxylic chloride of the formula



wherein R_1 is hydrogen or methyl and R_2 is methyl, with lithium tri-tert.-butoxy-aluminium hydride to 4-(6-carbomethoxyhexyl)-thiazole-5-carbaldehyde of the formula

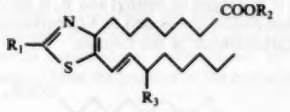


wherein R_1 is hydrogen or methyl and R_2 is methyl, then reacting the last-named compound with 2-oxo-heptylidene-triphenyl phosphorane to obtain 4-(6-carbomethoxyhexyl)-5-(3-keto-1-trans-octenyl)-thiazole of the formula

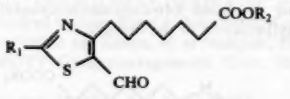


wherein R_1 is hydrogen or methyl and R_2 is methyl.

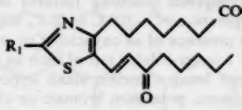
4. A process for the production of thiazole derivatives of the formula



wherein R_1 and R_2 are hydrogen or methyl and R_3 is oxo, hydroxyl or acetoxy, comprising converting 4-(6-carbomethoxyhexyl)-thiazole-5-carbaldehyde of the formula



wherein R_1 is hydrogen or methyl and R_2 is methyl, with the sodium derivative of 2-oxoheptylphosphonic acid dimethylester or with 2-oxo-heptylidenetriphenyl phosphorane into 4-(6-carbomethoxyhexyl)-5-(3-keto-1-trans-octenyl)-thiazole of the formula



wherein R_1 is hydrogen or methyl and R_2 is methyl.

4,052,408

OXYACETIC ACID COMPOUNDS AND PROCESS FOR THEIR MANUFACTURE

Karl Heusler, Basel, Switzerland, and Robert Burns Woodward, Cambridge, Mass., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

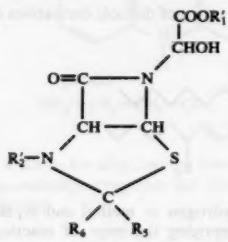
Continuation of Ser. No. 843,754, July 22, 1969, abandoned. This application Nov. 18, 1974, Ser. No. 524,699

Claims priority, application Switzerland, July 23, 1968, 10994/68; July 23, 1968, 10995/68; July 23, 1968, 10996/68; Dec. 11, 1968, 18502/68; Dec. 11, 1968, 18503/68; Dec. 11, 1968, 18505/68

Int. Cl.² C07D *513/04*

U.S. Cl. 260—306.7 C **5 Claims**

1. A compound of the formula



(Ia)

in which R_1' represents a member selected from the group consisting of hydrogen, lower alkyl, halogeno-lower alkyl, and phenyl-lower alkyl, R_2' represents a member selected from the group consisting of a hydrogen atom and an acyl residue of a lower alkyl, lower alkenyl, phenyl or phenyl-lower alkyl half-ester of carbonic acid, and each of the radicals R_5 and R_6 stands for lower alkyl, each of said lower alkyl and lower alkenyl groups having up to 7 carbon atoms.

4,052,409

DISUBSTITUTED TRIPHENYLMETHYLIMIDAZOLES

Karl Heinz Buchel; Erik Regel, and Manfred Plempel, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Mar. 8, 1973, Ser. No. 339,430

Claims priority, application Germany, Mar. 22, 1972, 2213863

Int. Cl.² C07D *233/62*

U.S. Cl. 548—341 **3 Claims**

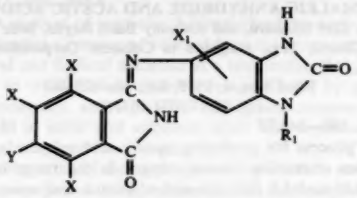
1. 1-(2,6-Dichlorophenyl-diphenyl)-methyl-imidazole or a pharmaceutically acceptable non-toxic salt thereof.

4,052,410
IMINOISOINDOLINE PIGMENTS

Jost von der Crone; Andre Pugin, both of Riehen, and Rudolf Mory, Dornach, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 472,401, May 22, 1974, Pat. No. 3,979,386. This application July 12, 1976, Ser. No. 704,276
Claims priority, application Switzerland, May 29, 1973, 7718/73; May 29, 1973, 7719/73
Int. Cl.² C07D 403/12, 401/12
U.S. Cl. 548—305 3 Claims

1. An iminoisoindolinone of the formula



wherein

X represents a halogen atom,

Y represents a halogen atom, alkoxy of 1–4 carbon atoms, phenoxy, chlorophenoxy, methylphenoxy, or alkylthio of 1 or 2 carbon atoms,

R_1 represents a hydrogen atom, alkyl having 1–4 carbon atoms, unsubstituted phenyl, phenyl substituted by a halogen atom, alkyl having 1–4 carbon atoms, alkoxy having 1–4 carbon atoms, or alkanoylamino having 1–4 carbon atoms,

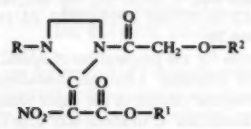
X_1 represents a hydrogen atom, a halogen atom, alkyl having 1–4 carbon atoms, alkoxy having 1–4 carbon atoms, or phenoxy.

4,052,411
ESTERS OF DERIVATIVES OF 2-IMIDAZOLIDINYLIDENENITROACETIC ACID

Steven A. Roman, Oakdale, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 6, 1976, Ser. No. 729,741
Int. Cl.² C07D 233/26
U.S. Cl. 548—342 2 Claims

1. A compound of the formula:



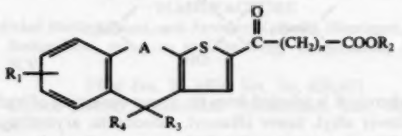
wherein R and R^1 each is alkyl of from one to twenty carbon atoms and R^2 is 2,4-dichloro-, 2-methyl-4-chloro- or 2,4,5-trichloro-phenyl.

4,052,412
BENZO CYCLOHEPTATHIOPHENE CARBOXYLIC ACID DERIVATIVES

Jean-Michel Bastian, Therwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation-in-part of Ser. No. 644,816, Dec. 29, 1975, abandoned, which is a continuation of Ser. No. 511,994, Oct. 4, 1974, abandoned. This application Apr. 2, 1976, Ser. No. 673,257
Claims priority, application Switzerland, Oct. 10, 1973, 14396/73; May 22, 1975, 6582/75
Int. Cl.² C07D 333/24; A01N 9/00
U.S. Cl. 260—332.2 A 27 Claims

1. A compound of formula I,



wherein

R_1 is hydrogen, halogen of atomic number from 9 to 35 or lower alkyl,

R_2 is hydrogen or lower alkyl,

R_3 and R_4 together are oxygen,

n is 2, 3 or 4, and

A is ethylene or vinylene,

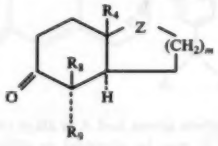
or when R_2 is hydrogen alternatively in pharmaceutically acceptable salt form.

4,052,413
STEREOSPECIFIC TOTAL STEROIDAL SYNTHESIS VIA SUBSTITUTED C/D-TRANS INDANONES

Zoltan George Hajos, Upper Montclair, N.J., assignor to Hoffmann-La Roche, Inc., Nutley, N.J.

Division of Ser. No. 482,711, June 24, 1974, Pat. No. 3,984,473, which is a division of Ser. No. 765,023, Oct. 4, 1968, Pat. No. 3,897,460. This application July 14, 1976, Ser. No. 705,376
Int. Cl.² C07D 317/72
U.S. Cl. 260—340.9 AS 1 Claim

1. A compound of the formula



wherein Z is ethylenedioxymethylene; R_4 is hydrogen or lower alkyl; m is an integer having the value of 1 or 2 and R_8 and R_9 is methylene;

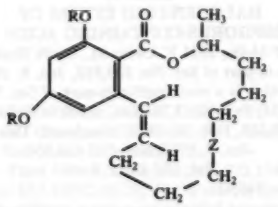
its optical enantiomer and the racemate thereof.

4,052,414
CIS-ZEARALANONE, CIS-ZEARALENOL, AND CIS-ZEARALENE

Charles Allan Peters, Wichita, Kans., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

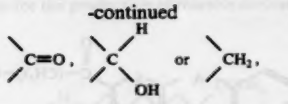
Continuation-in-part of Ser. No. 523,414, Nov. 13, 1974, abandoned, which is a continuation of Ser. No. 317,117, Dec. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 119,833, March 1, 1971, abandoned. This application Nov. 20, 1975, Ser. No. 633,691
Int. Cl.² C07D 313/00
U.S. Cl. 260—343.41 6 Claims

1. An essentially pure cis compound of the formula:



wherein Z is

-continued



and wherein R is selected from the group consisting of hydrogen, lower alkyl, lower alkanoyl, monocyclic aryl of up to about 10 carbon atoms, and aralkyl of monocyclic aryl containing up to about 10 carbon atoms and lower alkyl.

4,052,415

MANUFACTURE OF LACTONES OF THE TRIPHENYLMETHANE SERIES

Kurt Mayer, Ludwigshafen, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Germany

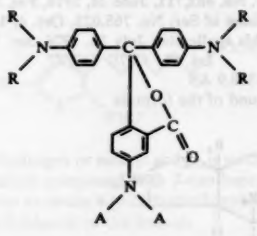
Filed Dec. 3, 1976, Ser. No. 747,398

Claims priority, application Germany, Dec. 20, 1975, 2557687

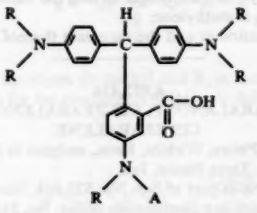
Int. Cl.[2] C07D *307/94;* C09B *11/24;* C07D *307/88*

U.S. Cl. 260—343.4 **10 Claims**

1. A process for the manufacture of compounds of the formula



where R is alkyl of 1 to 4 carbon atoms and A is alkyl of 1 to 4 carbon atoms, and R and A may be identical or different, wherein compounds of the formula



are oxidized with air, oxygen or oxygen-air mixtures in an acid medium, at a pH of from 1.5 to 5.5, in the presence or absence of oxidation catalysts, at from 30° to 150° C.

4,052,416

HALOGENATED ESTERS OF PHOSPHORUS-CONTAINING ACIDS (II)

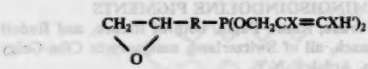
Gaetano F. D'Alelio, 2011 E. Cedar St., South Bend, Ind. 46617

Continuation-in-part of Ser. No. 539,812, Jan. 9, 1975, Pat. No. 3,970,727, which is a continuation-in-part of Ser. No. 179,543, Sept. 10, 1971, Pat. No. 3,780,144, which is a continuation of Ser. No. 785,335, Dec. 19, 1968, abandoned. This application Jan. 5, 1976, Ser. No. 646,504

Int. Cl.[2] C07F *9/40*

U.S. Cl. 260—348.42 **4 Claims**

1. A phosphorus halogen-containing compound having the formula



wherein X represents Cl or Br and R represents CH_2 or CH_2CH_2.

4,052,417

VAPOR PHASE OXIDATION OF BUTANE PRODUCING MALEIC ANHYDRIDE AND ACETIC ACID

William Earl Slinkard, and Anthony Basil Baylis, both of Corpus Christi, Tex., assignors to Celanese Corporation, New York, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,440

Int. Cl.[2] C07D *307/60*

U.S. Cl. 260—346.75 **10 Claims**

1. A process for producing maleic acid anhydride which comprises contacting butane, oxygen in the range between about 0.05 and 5.0 mol per mol of butane and water in the vapor phase at a temperture between about 180° C and 350° C with a reduced molybdenum catalyst wherein said molybdenum catalyst consists essentially of a catalyst prepared by reducing a calcined mixture of molybdenum compound coprecipitated with phosphorus compound.

6. A process for producing maleic acid anhydride which comprises contacting butane, oxygen in the range between about 0.05 and 5.0 mol per mol of butane and water in the vapor phase at a temperature between about 180° C and 350° C with a reduced molybdenum catalyst wherein said molybdenum catalyst consists essentially of a catalyst prepared by reducing a calcined mixture of a molybdenum compound and phosphorus compound coprecipitated with one or more metal compounds selected from the group consisting of a bismuth compound and a niobium compound.

4,052,418

PREPARATION OF MALEIC ANHYDRIDE FROM FOUR-CARBON HYDROCARBONS

Dev D. Suresh, Macedonia; Noel J. Bremer, Stow, and Robert K. Grasselli, Chagrin Falls, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Aug. 6, 1975, Ser. No. 602,343

Int. Cl.[2] C07D *307/60;* B01J *21/02, 23/16, 23/84*

U.S. Cl. 260—346.74 **9 Claims**

1. In the process for the preparation of maleic anhydride by the oxidation of n-butane, n-butenes, butadiene or mixture thereof with molecular oxygen in the vapor phase at a reaction temperature of about 300° C to about 600° C in the presence of a catalyst, the improvement comprising using as a catalyst a catalyst of the formula:

$$A_aV_bD_cO_x$$

wherein

A is at least one element selected from the group consisting of an alkali metal, zinc, cadmium, arsenic, copper, cerium, thorium, tin, manganese, iron and uranium; and

D is at least one element selected from the group consisting of boron, niobium, tantalum, antimony, tungsten and chromium;

and wherein

a is 0 to 5;

b and *c* are 0.1 to 10; and

x is the number as determined by the combined valence requirements of elements other than oxygen present in the catalyst.

4,052,419

METHOD OF PREPARING 5-NITROFURFURAL DIACETATE

Solomon Aronovich Giller, ulitsa Pernavas, 10, kv. 76; Karl Karlovich Venter, ulitsa Sporta, 7, kv. 10; Margarita Aldonovna Trushule, ulitsa Katrindambis, 22-D, kv. 10; Guntis Erikovich Berggrin, ulitsa Pernavas, 57, kv. 10; Robert Avgustovich Brinkmanis, ulitsa Brivzemnieka, 22, kv. 4, all of Riga; Uldis Yanovich Mikstais, ulitsa Elgavas, 4, kv. 64, and Paul Alexandrovich Stankevich, ulitsa Mendeleeva, 20, kv. 84, both of Olaine, all of U.S.S.R.

Filed May 27, 1975, Ser. No. 580,900
Int. Cl.² C07D *307/71*
U.S. Cl. 260—347.4 9 Claims

1. A method of preparing 5-nitrofurfural diacetate comprising nitrating a compound selected from the group consisting of furfural and furfural diacetate at a temperature ranging from −10° to +10° C; said nitrating being effected by gradually, simultaneously, and separately adding said compound and a mixture of nitric and sulphuric acids into acetic anhydride having a temperature ranging from −10° to +10° C with constant stirring of the resulting reaction mixture; molar ratios of the compound being nitrated, nitric and sulphuric acids being maintained equal to 1:1.1–2:0.036–0.041, respectively; said compound and the mixture of acids being added into the acetic anhydride at such rates as to maintain the nitrating reaction temperature at a predetermined level; said furfural diacetate, when used as the compound being nitrated, being employed in the form of its solution in acetic anhydride; treating the reaction mixture resulting from the nitration with water at a temperature ranging from 0° to 15° C at a weight ratio between water and the starting acetic anhydride of from 1.1:1 to 1.8:1, respectively, and neutralizing it with an alkali to a pH of 3.5–5 at a temperature of from 0° to 25° C, then maintaining the reaction mixture at a pH within said range at a temperature of from 45° to 55° C, and thereafter isolating the desired product from the reaction mixture.

4,052,420

PROCESS FOR PRODUCING DIURETHANE FROM DINITRO COMPOUNDS, HYDROXYL COMPOUNDS AND CARBON MONOXIDE

George C. Licke, Oxford, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed Sept. 22, 1975, Ser. No. 615,762
The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.
Int. Cl.² C07C *125/06*
U.S. Cl. 260—351 10 Claims

1. In a process for preparing a diurethane by the reaction at elevated temperature and pressure of an organic dinitro compound, carbon monoxide, and an alcohol or phenol in the presence of a catalyst, the improvement which comprises conducting said reaction in the presence of a promoter amount of an alkyl nitrile compound using substantially amorphous rhodium oxide as the catalyst, and conducting the reaction in two stages, (1) the first stage comprising conducting the reaction at a first elevated temperature and pressure, said first elevated temperature and pressure being high enough for substantial carbonylation of at least one of the nitro groups of said dinitro compound but not high enough for any untoward reduction of the nitro groups of said dinitro compound, and (2) the second stage comprising conducting the reaction at a second elevated temperature and pressure, said second elevated temperature and pressure being higher than said first elevated temperature and pressure and being sufficient to substantially carbonylate remaining nitro groups of said dinitro compound, whereby the yield of diurethane is increased over that obtained by carrying out the reaction at substantially one temperature and pressure.

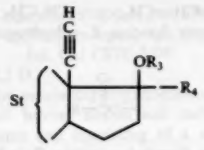
4,052,421

13-ETHINYL-STEROIDS AND PROCESSES FOR THEIR MANUFACTURE

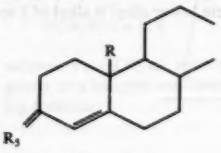
Michel Biollaz, Basel, and Jaroslav Kalvoda, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

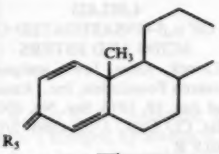
Filed Jan. 20, 1976, Ser. No. 650,653
Claims priority, application Switzerland, Jan. 30, 1975, 1123/75
Int. Cl.² C07J *1/00*
U.S. Cl. 260—397.5 14 Claims

7. 13-Ethinyl-steroids of the general formula

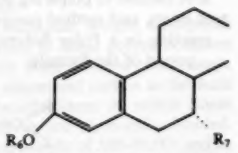


wherein R_3 denotes a hydrogen atom or a lower alkyl or lower alkanoyl group, R_4 denotes a hydrogen atom or a lower aliphatic hydrocarbon radical, or OR_3 and R_4 together denote an oxo group, and St represents a residue selected from a group consisting of residues of the partial formulae





and



wherein R and R_7 each denotes a hydrogen atom or the methyl group, R_5 denotes an oxo group, a hydrogen atom together with a free hydroxyl group, a hydrogen atom together with an esterified hydroxyl group, or two hydrogen atoms, and R_6 denotes a hydrogen atom or a lower alkyl group.

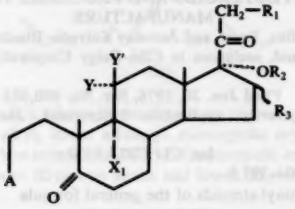
4,052,422

4,5-SECOPREGNANE DERIVATIVES

Christopher M. Cimarusti, Hamilton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 8, 1974, Ser. No. 522,178
Int. Cl.² C07C *49/26, 69/18, 69/30, 69/78*
U.S. Cl. 260—408 13 Claims

1. A compound having the structure



wherein A is $-CH=CH_2$ or $-CH_2CH_3$; X_1 is hydrogen, chlorine, bromine or fluorine; R_1 is hydrogen, hydroxyl,

chlorine, bromine, fluorine or iodine; R_2 is hydrogen or

R_3 is hydrogen, α-methyl, β-methyl, or methylene; R_4 is lower alkyl or phenyl; and Y is hydrogen and Y' is hydroxyl or together Y and Y' are =O; wherein lower alkyl is alkyl of 1 to 7 carbon atoms.

4,052,423

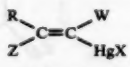
SYNTHESIS OF α,β-UNSATURATED CARBOXYLIC ACIDS AND ESTERS

Richard Craig Larock, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

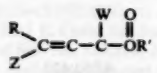
Filed Jan. 19, 1976, Ser. No. 650,143
Int. Cl.² C11C 3/02; C09F 5/08
U.S. Cl. 260—410.9 R **14 Claims**

1. A method of preparing alpha beta-unsaturated carboxylic acid esters, said method comprising:

reacting in a Polar Solvent a vinylmercuric halide compound of the formula:



in the presence of a noble metal carbonylation promoter selected from the group consisting of reaction equivalent amounts of noble metal simple salts in combination with lithium chloride, catalytic amounts of noble metals, and noble metal halide simple salts with carbon monoxide and an alcohol of the formula R'OH to provide an alpha beta-unsaturated carboxylic acid ester of the formula:



at a percentage of theoretical yield of at least 85 weight %, wherein R, Z, W and R' are hydrogen or organic moieties which are non-reactive in the carbonylation reaction which occurs between said carbon monoxide and said vinylmercuric halide, of preselected determination to represent the desired ester being synthesized, and X is a halide.

4,052,424

PRODUCTION OF ESTERS FROM ALCOHOLS

Thomas H. Vanderspurt, Gillette, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Sept. 1, 1976, Ser. No. 719,548
Int. Cl.² C09F 5/08; C11C 3/02
U.S. Cl. 260—410 **9 Claims**

1. A process for producing alkyl alkanoate esters which comprises contacting primary alkanol in vapor phase with a silver-cadmium alloy catalyst at a temperature between about 250° C and 600° C, wherein the atomic ratio of silver to cadmium in the alloy is in the range of between about 0.1 and 3 to 1.

4,052,425

FATTY ACID FEED STOCK BLEND OF RED OIL AND SOAP STOCK FOR THE PREPARATION OF DIMER FATTY ACIDS

Edward C. Leonard, Memphis, Tenn., assignor to Kraft, Inc., Glenview, Ill.

Filed Aug. 20, 1975, Ser. No. 606,187
Int. Cl.² C11C 1/00
U.S. Cl. 260—413 **6 Claims**

1. A fatty acid feed stock suitable for use in the preparation of dimer fatty acids having properties generally similar to dimer fatty acids produced from tall oil fatty acids, said feed stock comprising a distillation product derived from about 35 percent to about 45 percent by weight of crude red oil and from about 55 percent to about 65 percent by weight crude soya fatty acid soap stock, said feed stock having a composition of from about 0.5 to about 2 percent by weight of palmitoleic acid, from about 40 to about 52 percent by weight of oleic acid, from about 20 to about 40 percent by weight of linoleic acid, from about 2 to about 7 percent by weight of linolenic acid and from about 3.5 to about 11.5 percent by weight of saturated fatty acids.

4. A method for providing a fatty acid feed stock suitable for use in the preparation of dimer fatty acids having properties generally similar to dimer fatty acids produced from tall oil fatty acids, said method comprising providing a blend of from about 35 percent to about 45 percent by weight of crude red oil and from about 55 percent to about 65 percent by weight crude soya fatty soap stock, and distilling said blend of said crude red oil or said soap stock to provide a fatty acid feed stock having a composition of from about 0.5 to about 2 percent by weight of palmitoleic acid, from about 40 to about 52 percent by weight of oleic acid, from about 20 to about 40 percent by weight of linoleic acid, from about 2 to about 7 percent by weight linolenic acid and from about 3.5 to about 11.5 percent by weight of saturated fatty acids.

4,052,426

PROCESS FOR THE MANUFACTURE OF DIMETHYL-TIN DICHLORIDE

Wolfgang Wehner, Zwingenberg; Rudolf Maul, Lorsch, Hessen, and Hans-Wolf Jung, Burgdorf-Ehlershausen, all of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 509,886, Sept. 27, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,865
Claims priority, application Switzerland, Oct. 1, 1973, 14031/73
Int. Cl.² C07F 7/22
U.S. Cl. 260—429.7 **8 Claims**

1. An improved process for the manufacture of dimethyl-tin dichloride by the reaction of metallic tin or tin alloys with methyl chloride at 100° to 300° under a pressure of 0 to 150 atmospheres gauge in the presence of at least one compound of formula I

$$[R_3P(R'Cl)_2]SnCl_4 \qquad (I)$$

in which R is a straight or branched chain alkyl of 1 to 18

carbon atoms, R' has the same meaning as R or is a Cl atom and *a* has the value 0 or 1, wherein the improvement comprises carrying out the reaction in the presence of a solvent selected from the group consisting of cyclic sulfones, cyclic carbonates and cyclic thiocarbonates.

4,052,427
PROCESS FOR THE PREPARATION OF DIALKYLTIN DIHALIDES

William E. Leistner, Atlanta Beach, N.Y.; Gerald H. Spiegelman, Wayne, and Louis J. Hover, Oak Ridge, both of N.J., assignors to Witco Chemical Corporation, New York, N.Y.

Filed June 21, 1976, Ser. No. 698,451
Int. Cl.² C07F 7/22
U.S. Cl. 260—429.7 **11 Claims**

1. A process for the preparation of dialkyltin dihalides of the formula:

$$R\ R'\text{-}SnX_2$$

wherein R equals methyl or R'; R' equals C_2-C_{20} alkyl; and X equals halogen; comprising;

a. refluxing Me_2SnX_2 and R'X in a molar ratio of about 1:1 to 1:3 in the presence of a phosphonium iodide catalyst at about 150°–200° C for from 1 to 50 hours and;

b. recovering the dialkyltin dihalide product having one or more methyl group of the Me_2SnX_2 replaced by R'.

4,052,428
STABLE ALUMINUM ALKOXIDE SOLUTIONS

Robert Wendell Lerner, Trumbull, Conn.; Russell S. Towers, and John Robert Flasch, both of Adrian, Mich., assignors to Stauffer Chemical Company, Adrian, Mich.

Filed Dec. 15, 1975, Ser. No. 640,502
Int. Cl.² C07F 5/06
U.S. Cl. 260—448 AD **4 Claims**

1. An improved process for preparing stable solutions of aluminum butoxides by reacting metallic aluminum with butyl alcohol, the improvement which comprises reacting metallic aluminum with a mixture containing isobutyl alcohol and n-butyl alcohol at the reflux temperature of the alcohols but below the decomposition temperature of the aluminum butoxides, said alcohols are present in a mol ratio of isobutyl alcohol to n-butyl alcohol of from 1:1 to 20:1.

4,052,429
METHOD OF FORMING A COMPOUND CONTAINING ALUMINUM AND GLYCEROL

George C. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Filed Jan. 13, 1975, Ser. No. 540,786
The portion of the term of this patent subsequent to Dec. 24, 1991, has been disclaimed.
Int. Cl.² C07F 5/06
U.S. Cl. 260—448 AD **9 Claims**

1. A method of forming a compound containing aluminum and glycerol which comprises:

contacting and reacting:

a. a reactive aluminum comprising aluminum of a purity of at least about 99.9% by weight permeated with a liquid metal selected from mercury, gallium and indium/gallium alloys;

in a reaction medium consisting essentially of:

b. glycerol; and

c. a liquid selected from

i. water;

ii. lower alcohols;

iii. glycols; and

iv. phenols,

said reactive aluminum being consumed during the reaction to form said compound containing aluminum and glycerol; and

terminating the reaction to recover said compound containing aluminum and glycerol by withdrawing any unreacted reactive aluminum from the reaction medium.

4,052,430
METHOD FOR PRODUCING ORGANOSILICON HIGH MOLECULAR WEIGHT COMPOUNDS HAVING SILICON AND CARBON AS MAIN SKELETON COMPONENTS AND SAID ORGANOSILICON HIGH MOLECULAR WEIGHT COMPOUNDS

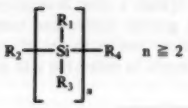
Seishi Yajima; Josaburo Hayashi, and Mamoru Omori, all of Oharai, Japan, assignors to The Research Institute for Iron, Steel and Other Metals of the Tohoku University, Sendai, Japan

Filed Apr. 19, 1976, Ser. No. 677,959
Claims priority, application Japan, Apr. 26, 1975, 50-50223
Int. Cl.² C07F 7/08
U.S. Cl. 260—448.2 D **5 Claims**

1. A method for producing organosilicon high molecular weight compounds having silicon and carbon as the main skeleton components and consisting of a mixture of linear polycarbosilanes having silicon and carbon as the main skeleton components, cyclic polycarbosilanes having silicon and carbon as the main skeleton components and polycarbosilanes in which linear carbosilane and cyclic carbosilane are chemically bonded, which comprises thermally decomposing and polycondensing at least one of organosilicon compounds having polysilane skeleton selected from the group consisting of cyclic polysilanes shown by the following formula

$$(R_1{\cdot}R_2{\cdot}Si)n,\ n \geqq 4$$

wherein R_1 and R_2 are hydrogen, alkyl group, aryl group, silyl group, or a halogen and linear polysilane shown by the following formula



wherein R_1, R_2, R_3 and R_4 are hydrogen, alkyl group, aryl group, silyl group or a hologen, by heating at a temperature of 300°–2,000° C under at least 1 atmosphere of an inert gas and hydrogen gas or under a vacuum.

5. The organosilicon high molecular weight amorphous compounds consisting of a mixture of linear polycarbosilanes having silicon and carbon as the main skeleton components, cyclic polycarbosilanes having silicon and carbon as the main skeleton components and polycarbosilanes in which linear carbosilane and cyclic carbosilane are chemically bonded, which have an average molecular weight of 300–50,000 and an intrinsic viscosity of 0.005–1.50.

4,052,431
PROCESS FOR THE PRODUCTION OF COMMERCIAL ALPHA OLEFIN SULFONATES

Thomas G. Baker, Wilmette, and Raymond J. Shute, Chicago, both of Ill., assignors to Stepan Chemical Company, Northfield, Ill.

Filed Mar. 3, 1976, Ser. No. 663,611
Int. Cl.² C07C 139/14; C07B 13/02
U.S. Cl. 260—513 T **12 Claims**

1. In a process for making an alpha olefin sulfonate product by contacting a stream of vaporized sulphur trioxide in an inert gas mixture with alpha olefins containing from about 8 through 24 carbon atoms per molecule followed by admixture of the reaction product with aqueous alkali metal hydroxide to produce an aqueous mixture which comprises, on a 100 weight percent total weight basis at least about 52 weight percent water with the balance up to 100 weight percent comprising

solids, said solids comprising, on a 100 weight percent dry basis, from about 50 to 90 weight percent of alkali metal salts of alpha olefin sulfonate, from about 5 to 40 weight percent dispersed residual oil, and the balance up to 100 weight percent being alkali metal hydroxide, the exact amount of alkali metal hydroxide present in any given system being sufficient to maintain a pH in said aqueous mixture greater than about 12, the improvement which is to substantially completely eliminate sultones from the final product and comprises the steps of

A. heating such resulting aqueous mixture at a temperature of from about 95° to 190° C while maintaining said system under a pressure of from about atmospheric to about 230 p.s.i. for a time typically ranging from about 30 minutes to 8 hours but which is sufficient to substantially completely eliminate sultones from residual oil in said system, said heating being conducted while maintaining sufficient dissolved free alkali metal hydroxide present in said system to produce a system pH in the range of from about 12 to 14,

B. cooling the resulting system to a temperature not above about 60° C, and

C. contacting such cooled resulting system under liquid phase aqueous conditions with sodium hypochlorite bleaching agent, the total active ingredient amount of said bleaching agent used being from about 0.1 to 6 weight percent of the total weight of alkali metal sulfonates present in said resulting system, said contacting being conducted while maintaining said resulting system at a pH in the range of from about 12 to 14 and while maintaining a temperature of from about 25° to 60° C, said contacting being conducted for a time sufficient to produce a product having a Klett color based on 5 weight percent alpha olefin sulfonate in water of less than about 180, such bleaching substantially completely preventing reformation of sultones.

4,052,432

N-(1,1 SUBSTITUTED ACETONITRILO)-α-(3,5-SUBSTITUTED PHENOXY) ALKYL AMIDES

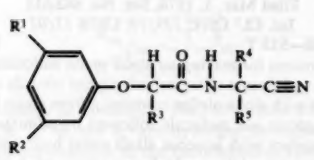
Don R. Baker, Orinda, and Francis H. Walker, Mill Valley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 524,424, Nov. 18, 1974, abandoned, which is a continuation of Ser. No. 396,922, Sept. 13, 1973, abandoned, which is a continuation of Ser. No. 157,059, June 25, 1971, abandoned. This application May 20, 1976, Ser. No. 688,498

Int. Cl.² A01N 9/20; C07C 121/78

U.S. Cl. 260—465 D **3 Claims**

1. Compounds of the formula



in which R^1 and R^2 are methyl or chlorine; R^3 is ethyl; R^4 is methyl; and R^5 is methyl.

4,052,433

AROMATIC AZOMETHINES

Wilfried Sahm, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Germany

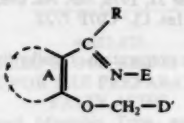
Division of Ser. No. 567,357, April 11, 1975, Pat. No. 3,994,879, which is a division of Ser. No. 427,016, Dec. 13, 1973, Pat. No. 3,892,807. This application Sept. 9, 1976, Ser. No. 721,811

Claims priority, application Switzerland, Dec. 18, 1972, 18397/72

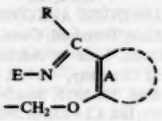
Int. Cl.² C07C 119/00

U.S. Cl. 260—465 E **5 Claims**

1. A compound of the formula



in which A is phenyl or naphthyl which is unsubstituted or substituted by halogen, lower alkyl, lower alkoxy, lower alkylene forming an annellated ring, or phenyl, R is hydrogen, lower alkyl or phenyl, E is lower tertiary alkyl, phenyl, chlorophenyl, lower alkyl phenyl, lower hydroxyalkyl phenyl or naphthyl and D' is phenyl, naphthyl, styryl, or a bivalent group selected from ethenylene, phenylene and p,ω-styrylene which bivalent group is substituted by a group of the formula



in which A, R and E are as defined above, which radical D' may be substituted by carboxy, lower carboalkoxy, cyano, or nitro.

4,052,434

PROSTAGLANDIN INTERMEDIATES

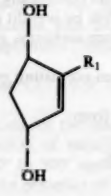
David A. Evans, Pasadena, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Division of Ser. No. 499,287, Aug. 21, 1974, which is a continuation-in-part of Ser. No. 349,888, April 10, 1973, abandoned. This application May 17, 1976, Ser. No. 687,420

Int. Cl.² C07C 61/38, 69/74

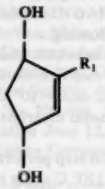
U.S. Cl. 560—121 **2 Claims**

1. A compound of the formula:



wherein R_1 is a member of the group consisting of alkyl, (cis or trans) alkenyl and alkynyl groups of from 2 to 9 carbon atoms substituted by a terminal carboxyl group.

2. A compound of the formula:



wherein R_1 is a member of the group consisting of alkyl, (cis or trans) alkenyl and alkynyl groups of from 2 to 9 carbon atoms substituted by a terminal carboalkoxyl (—COOR') group where R' is an alkyl group of 1 to 6 carbon atoms.

4,052,435

ETHYL 4-METHYL-2,6-CYCLOOCTADIENE-1-CARBOXYLATE

Gunther Wilke, and Paul Heimbach, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Division of Ser. No. 585,287, June 9, 1975, which is a division of Ser. No. 463,087, April 22, 1974, Pat. No. 3,929,921, which is a division of Ser. No. 109,949, Jan. 26, 1971, Pat. No. 3,849,506, which is a division of Ser. No. 843,220, July 18, 1969, Pat. No. 3,586,727, and Ser. No. 845,901, July 29, 1969, Pat. No. 3,629,347, and Ser. No. 845,904, July 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 582,775, Sept. 27, 1966, abandoned. This application Nov. 1, 1976, Ser. No. 739,166

Claims priority, application Germany, Sept. 29, 1965, 1493221

Int. Cl.[2] C07C *69/74*

U.S. Cl. 560—128 **2 Claims**

1. Compounds of the formula:

$$A - \Theta - B$$

wherein:

Θ is cyclooctadiene-(1,5);

A is 3-carboethoxy, and

B is methyl in the 8 position.

4,052,436

FLUORENE-2-ACETIC ACIDS AND DERIVATIVES, PROCESS AND METHOD OF USING

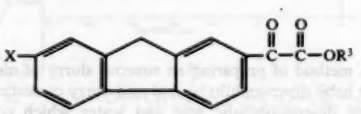
Eric T. Stiller, Sarasota, Fla.; Seymour D. Levine, North Brunswick, N.J.; Pacifico A. Principe, South River, N.J., and Patrick A. Diassi, Westfield, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 510,850, Sept. 30, 1974, Pat. No. 3,989,841, which is a continuation of Ser. No. 298,102, Oct. 16, 1972, Pat. No. 3,856,977, which is a continuation-in-part of Ser. No. 70,913, Sept. 9, 1970, Pat. No. 3,859,340. This application Aug. 17, 1976, Ser. No. 715,033

Int. Cl.[2] C07C *69/76*; A61K *31/235*

U.S. Cl. 560—52 **5 Claims**

1. A compound having the structure



wherein X is selected from the group consisting of hydrogen, hydroxyl, lower alkyl, lower alkoxy, halogen, amino, trifluoromethyl and nitro; and R^3 is selected from the group consisting of hydrogen and lower alkyl.

4,052,437

PROCESS FOR PRODUCING URETHANE FROM NITRO COMPOUNDS, HYDROXYL COMPOUNDS AND CARBON MONOXIDE USING RHODIUM OXIDE CATALYSTS

George C. Licke, Oxford, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed Sept. 22, 1975, Ser. No. 615,778

Int. Cl.[2] C07C *125/06*

U.S. Cl. 560—25 **20 Claims**

1. In a process for preparing a urethane by reacting an organic nitro compound with carbon monoxide and an alcohol or phenol at an elevated temperature and an elevated pressure in the presence of a catalyst, the improvement which comprises carrying out the reaction in the presence of a promoter amount of an alkyl nitrile and employing as a catalyst substantially amorphous rhodium oxide.

4,052,438

PROCESS FOR PREPARING AROMATIC HYDROXY-CARBOXYLIC ACID ALKYL ESTERS

Theodor Papenfuhs, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 12, 1975, Ser. No. 549,173

Claims priority, application Germany, Feb. 15, 1974, 2407187

Int. Cl.[2] C07C *69/76*

U.S. Cl. 560—61 **3 Claims**

1. In a process for preparing an aromatic hydroxy-carboxylic acid alkyl ester by esterification of an aromatic hydroxy-carboxylic acid with a dialkyl sulfate in an aqueous medium, said ester and sulfate having 1–5 carbon atoms in the alkyl moiety, the improvement consisting of carrying out the esterification at a pH-value of about 4 to 6.5.

4,052,439

CARBOXYLIC ESTERS OF PHOSPHONOACETIC ACID

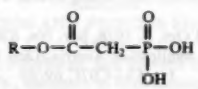
Thomas Raymond Herrin, Waukegan, and John Scott Fairgrieve, Lake Villa, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Apr. 30, 1976, Ser. No. 681,874

Int. Cl.[2] C07D *69/14*; A61K *31/22*

U.S. Cl. 560—129 **7 Claims**

1. A carboxylic ester of phosphonoacetic acid of the formula



wherein r is C_3–C_8 alkyl, aralkyl,

or adamantly.

4,052,440
METHOD FOR PREPARING MERCAPTO PROPIONIC ACID ESTERS AND POLYTHIO DIPROPIONIC ACID ESTERS

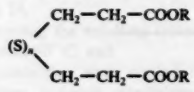
Shaul Gladstone, Arden; Srinivasa R. Rao, Newark, both of Del., and C. Joseph Rosshirt, Satsuma, Ala., assignors to Witco Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 380,006, July 17, 1973, abandoned. This application Sept. 19, 1975, Ser. No. 614,828
Int. Cl.² C07C *148/00, 149/20*
U.S. Cl. 560—154 **20 Claims**

1. A process for the preparation of at least one reaction product selected from the group consisting of mercaptopropionic acid esters of the formula:

$$HS—CH_2—CH_2—COOR$$

and polythiodipropionic acid esters of the formula:



wherein *n* is a number from 2 to 6 and R is selected from the group consisting of alkyl, cycloalkyl, and alkyl cycloalkyl having from one to about eight carbon atoms which comprises reacting hydrogen sulfide and an acrylic acid ester of the formula:

$$CH_2=CH—COOR$$

wherein R is selected from the group consisting of alkyl, cycloalkyl, and alkyl cycloalkyl having from one to about eight carbon atoms, in an essentially nonaqueous system containing less than 5% water and in the presence of a reactive solvent comprising polythiodipropionic acid ester of the formula above; the polythiodipropionic acid ester being present in an amount of at least 30% by weight of the total of any monothiodipropionic acid ester and of the polythiodipropionic acid ester present; and a weakly basic amine catalyst selected from the group consisting of ammonia, primary, secondary, and tertiary amines
and quaternary amines; the weakly basic amine catalyst being present in an amount within the range from about 0.1 to about 10% by weight of the reaction mixture; the reaction being carried out at a temperature within the range from about 0° to about 150° C and an H_2S concentration within the range from about 0.1% to saturation in the reactive solvent under the reaction conditions; and recovering at least one reaction product selected from the group consisting of mercaptopropionic acid ester and polythiodipropionic acid ester from the resulting reaction mixture.

4,052,441
SEPARATION OF ACIDS AND ESTERS IN THE PROCESSING OF WASTE SALT SOLUTION OF CYCLOHEXANONE MANUFACTURE

Josef Klemens Brunner, Scheuchzerstrasse 47, Zurich, Switzerland

Filed Oct. 7, 1975, Ser. No. 620,306
Claims priority, application Austria, Oct. 10, 1974, 8175/74
Int. Cl.² C07C *69/66*
U.S. Cl. 560—179 **8 Claims**

1. In a process for producing esters of monocarboxylic acids and also dicarboxylic acids or their esters from the waste aqueous solution of cyclohexanone manufacture which consists essentially of salts of monocarboxy and dicarboxy straight chain aliphatic acids and of hydroxycaproic acid, comprising the steps of acidifying such a waste salt solution with a strong acid to produce an aqueous phase and an organic phase and then separating a water-containing fraction from the resulting organic phase by distillation at temperatures up to 120° C, followed by esterification of said water-containing fraction with a lower alcohol, the improvement whereby said distillation is accomplished in two distillation steps in a sequence of steps comprising the following:
a first distillation step in which mainly water is distilled off;
cooling the residue of said first distillation step to a temperature between +5° C and −10° C;
separating crystals of solid dicarboxylic acids precipitated in the cooling step,
and a second distillation step performed with fractionation at temperatures up to 120° C using the liquid remaining after removal of the crystals, for separation of the more volatile components both from a hydroxyacid fraction recoverable as a separate fraction and from the dicarboxylic acids that remain in the liquid residue.

4,052,442
PROCESS FOR PREPARING GLYCOL ESTERS

Masuhiko Tamura, and Teruo Yasui, both of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Japan

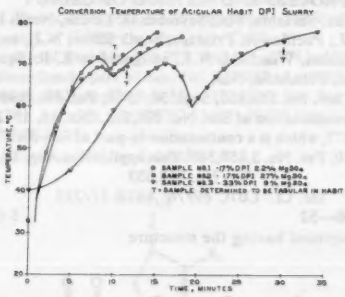
Filed Jan. 12, 1967, Ser. No. 608,756
Claims priority, application Japan, Jan. 21, 1966, 41-3557; Aug. 25, 1966, 41-56170
Int. Cl.² C07C *67/05*
U.S. Cl. 560—243 **15 Claims**

1. A process for preparing glycol esters from a monoolefin selected from alpha-monoolefinic aliphatic hydrocarbons having up to 8 carbon atoms and styrene, which consists essentially of contacting said monoolefin with a solution of a palladous salt and at least one compound selected from alkali metal nitrates and nitrites in an organic acid selected from alkanoic acids having not more than 7 carbon atoms and benzoic acid at a temperature ranging from 20° to 150° C.

4,052,443
PROCESS FOR PREPARING AQUEOUS SLURRIES OF TABULAR HABIT DIPERISOPHTHALIC ACID

Robert G. Briody, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 19, 1975, Ser. No. 633,184
Int. Cl.² C07C *179/10*
U.S. Cl. 260—502 R **1 Claim**



1. A method of preparing an aqueous slurry of metastable tabular habit diperisophthalic acid said slurry consisting essentially of diperisophthalic acid and water which comprises maintaining an aqueous slurry containing acicular habit diperisophthalic acid and having a water content of over 30 weight percent at a temperature from above 67° C. to about 90° C. whereby to convert acicular diperisophthalic acid to tabular habit diperisophthalic acid.

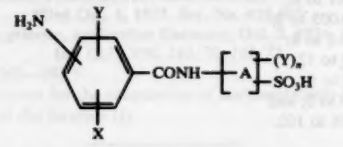
4,052,444

N-(AMINOBENZOYL)-AMINOARYLSULFONIC ACIDS

Günter Laubert, Frankfurt am Main, and Joachim Ribka, Offenbach, Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 325,597, Jan. 22, 1973, abandoned, and Ser. No. 325,656, Jan. 22, 1973, Pat. No. 3,997,523. This application June 12, 1975, Ser. No. 586,151
Claims priority, application Germany, Jan. 22, 1972, 2203093; Jan. 22, 1972, 2203094
Int. Cl.² C07C *143/52*; C09B *29/20*; C07C *149/40, 121/50*
U.S. Cl. 260—507 R 7 Claims

1. A N-(aminobenzoyl)-aminoarylsulfonic acid or its alkali metal salt of the formula



wherein X is hydrogen, chloride, bromine, lower alkyl, lower alkoxy, carbomethoxy, carboethoxy, mono- or dilower alkylamino, trifluoromethyl, phenyl, phenoxy, nitro or cyano, Y is hydrogen, chlorine, bromine, lower alkyl or lower alkoxy, A is phenyl or 1-naphthyl, n is 1 or 2, the sulfo group standing in 4-position.

4,052,445

PROCESS FOR THE PRODUCTION OF ALKYL SULFONIC ACIDS

Gerd Schreyer; Friedhelm Geiger, and Jorg Hensel, all of Hanau, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany

Continuation-in-part of Ser. No. 654,062, Feb. 2, 1976, abandoned. This application Feb. 4, 1976, Ser. No. 655,018
Claims priority, application Germany, Feb. 1, 1975, 2504201
Int. Cl.² C07C *143/02*
U.S. Cl. 260—513 R 13 Claims

1. A process for the production of an alkylsulfonic acid comprising oxidizing an alkyl mercaptan or a dialkyl disulfide with hydrogen peroxide in an inert medium in the presence of ammonium molybdate, alkali metal molydbate, ammonium tungstate or alkali metal tungstate.

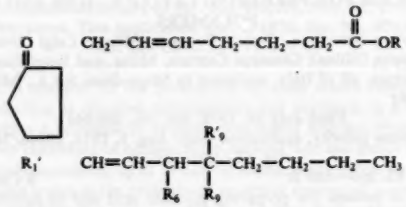
4,052,446

11,16-SUBSTITUTED PROSTAGLANDINS

George William Holland, Cedar Grove; Jane Liu Jernow, Verona, and Perry Rosen, North Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 386,117, Aug. 6, 1973, abandoned. This application June 18, 1974, Ser. No. 480,458
Int. Cl.² C07C *177/00*
U.S. Cl. 260—514 D 6 Claims

1. A compound of the formula



wherein R is hydrogen or lower alkyl; R_1' is lower alkyl; R_6 is OR_7; R_7 is hydrogen, lower alkanoyloxy, benzyloxy, benzyl, tetrahydropyranyl, alpha-lower alkoxy lower alkyl or tri lower alkyl silyl; R_9' is hydrogen or lower alkyl; and R_9 is lower alkyl, hydrogen or fluoro; with the proviso that R_9 and R_9' are not both hydrogen; or enantiomers or racemates thereof.

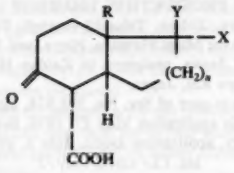
4,052,447

PROCESS FOR THE PREPARATION OF BICYCLOALKANE DERIVATIVES

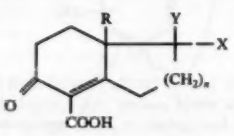
Helmut Dahl, and Hans Peter Lorenz, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Continuation of Ser. No. 461,279, April 16, 1974, abandoned. This application Dec. 18, 1975, Ser. No. 641,998
Claims priority, application Germany, Apr. 18, 1973, 2320285; Feb. 25, 1974, 2409597
Int. Cl.² C07C *51/36*
U.S. Cl. 260—514 G 6 Claims

1. In a process for the production of a bicycloalkane derivative of the formula



wherein *n* is the integer 1 or 2; R is methyl or ethyl, and X and Y collectively are oxo, alkylenedioxy of 2–6 carbon atoms inclusive and 2–3 bridging carbon atoms or phenylenedioxy or X is a hydrogen atom and Y is hydroxy, alkoxy of 1–6 carbon atoms, inclusive, or acyloxy wherein acyl is the acyl radical of a hydrocarbon carboxylic acid of 1–8 carbon atoms, inclusive, by the hydrogenation of a compound of the formula



wherein *n*, R, X and Y have the values given above, with hydrogen and a palladium-, platinum-, or rhodium-containing hydrogenation catalyst, the improvement which comprises hydrogenating the starting compound as its alkali metal salt in water at about 0° C.

4,052,448

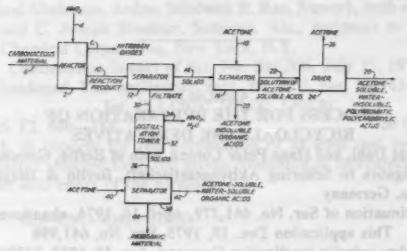
ORGANIC ACIDS AND PROCESS FOR PREPARING SAME

J. Gustav Schulz, Pittsburgh, and Edward T. Sabourin, Allison Park, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed June 16, 1976, Ser. No. 696,752
Int. Cl.² C07C *63/33*; C08J *9/14*
U.S. Cl. 260—515 H 7 Claims

1. A process for preparing a mixture of polycyclic aromatic polycarboxylic acids carrying nuclear nitro groups that is soluble in acetone but insoluble in water which comprises subjecting a slurry containing coal to reaction with aqueous nitric acid having a concentration of about 5 to about 90 percent at a temperature of about 15° to about 200° C. for about

0.5 to about 15 hours, mechanically separating the solids in the resulting slurry, extracting the resulting solids with a polar



solvent and then separating the polar solvent from the extract to recover the desired carboxylic acid mixture.

4,052,449

BIOLOGICALLY ACTIVE SUBSTANCE, BESTATIN, AND PRODUCTION THEREOF

Hamao Umezawa, Tokyo; Takaaki Aoyagi, Fujisawa; Tomio Takeuchi, Tokyo; Masa Hamada, Hoya, and Yoshiro Okami, Tokyo, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Japan

Continuation-in-part of Ser. No. 591,924, June 30, 1975, abandoned. This application May 27, 1976, Ser. No. 690,457
Claims priority, application Japan, July 1, 1974, 49-75090
Int. Cl.[2] C07C *101/72*
U.S. Cl. 260—519 **5 Claims**

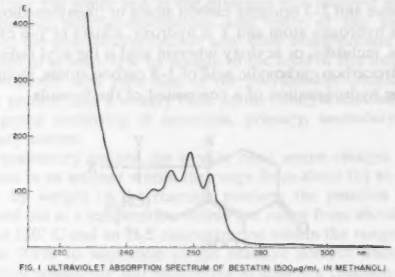


FIG. 1 ULTRAVIOLET ABSORPTION SPECTRUM OF BESTATIN (500μg/ml, IN METHANOL)

1. [(2S,3R)-3-amino-2-hydroxy-4-phenylbutanoyl]-L-leucine and nontoxic, pharmaceutically acceptable salts thereof.

4,052,450

CATALYTIC OXIDATION OF α-OLEFINS

Richard Krabetz, Kirchheim; Heinz Engelbach, Limburgerhof; Ulrich Lebert, Ludwigshafen; Walter Frey, Manheim; Gerd Duembgen, Dannstadt; Fritz Thiessen, and Carl-Heinz Willersinn, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Oct. 10, 1973, Ser. No. 405,152
Claims priority, application Germany, Oct. 12, 1972, 2249922
Int. Cl.[2] C07C *51/32*
U.S. Cl. 260—533 N **17 Claims**

1. A process for the oxidation of an α-olefinic hydrocarbon containing three to four carbon atoms in the gas phase with molecular oxygen to form an α-β-olefinically unsaturated carboxylic acid containing three to four carbon atoms, said process comprising passing a gas mixture of said α-olefinic hydrocarbon, molecular oxygen and an inert gas at a temperature of from 280° to 450° C. over a catalyst consisting essentially of the forumula :

$$Mo_aBi_bMe_c^1Me_d^2Me_e^3Me_f^4Me_g^5O_h$$

in which:

Me^1 is at least one metal selected from the group consisting of In and La;

Me^2 is at least one metal selected from the group consisting of Fe and Cu;

Me^3 is Ni ;

Me^4 is at least one element selected from the group consisting of P, B, As, Cr, V and W;

Me^5 is at least one metal selected from the group consisting of Ag, Pb, Mn, Re, Sn, Ge, Sm, Nb, Ta, Mg, Ca, Sr, Ba and Be;

a is 12;

b is 0.1 to 6;

c is 0.005 to 3;

d is 0.1 to 8;

e is 4 to 12;

f is 0 to 6;

g is 0 to 3; and

h is 36 to 102.

4,052,451

PREPARATION OF CALCIUM PANTOTHENATE

Robert D. Lekberg, 4040 W. 123rd St., Alsip, Ill. 60658

Filed Mar. 11, 1976, Ser. No. 666,040
Int. Cl.[2] C07C *99/04, 99/10*
U.S. Cl. 260—534 A **10 Claims**

1. A process for the preparation of calcium pantothenate comprising:

reacting beta-amino propionitrile with a substantially stoichiometric quantity of potassium hydroxide in aqueous media to produce potassium beta alanate;

distilling off volatiles produced in the reaction;

reacting the potassium beta alanate distilland with sulfuric acid to form free beta alanine and a precipitate of potassium sulfate;

separating the precipitated potassium sulfate and recovering the filtrate;

distilling the filtrate to remove water and recovering a concentrated filtrate;

treating the concentrated filtrate with low molecular weight anhydrous aliphatic alcohol to form a precipitate comprising a mixture of beta-alanine and entrained potassium sulfate;

reacting the beta-alanine and potassium sulfate mixture with calcium methoxide under substantially anhydrous conditions to form calcium beta alanate;

reacting the calcium beta alanate with racemic pantoyl lactone in the presence of the entrained potassium sulfate under substantially anhydrous conditions to form substantially pure calcium pantothenate; and

separating soluble calcium pantothenate from the remaining potassium sulfate which settles therefrom.

4,052,452

PROCESS FOR PREPARING GLYCOLIC ACID AND ITS POLYMERS

Salvatore Scardigno, Cesano Boscone (Milan); Luigi Rivolta, Monza (Milan); Giuseppe Caprara, Milan, and Luigi Cassar, Novara, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed July 29, 1975, Ser. No. 600,044
Claims priority, application Italy, Aug. 1, 1974, 25846/74
Int. Cl.[2] C07C *59/06*
U.S. Cl. 260—535 R **6 Claims**

1. A process for preparing glycolic acid and its polymers starting from formaldehyde, wherein the formaldehyde is reacted with carbon monoxide in concentrated H_2SO_4 as reaction medium, in the presence of a catalyst consisting essentially of Cu (I) or Ag oxides and acid salts thereof, and at a tempera-

ture ranging from 0° to 90° C and at a pressure between 0.1 and 30 atmospheres.

4,052,453

PROCESS FOR PREPARING ACETOACETAMIDE-N-SULFOFLUORIDE

Hartmut Pietsch, Hofheim, Taunus; Karl Clauss, Rossert; Harald Jensen, Frankfurt am Main, and Erwin Schmidt, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

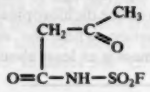
Filed Oct. 1, 1975, Ser. No. 618,405

Claims priority, application Germany, Oct. 3, 1974, 2447201

Int. Cl.² C07C *143/70, 143/72*

U.S. Cl. 260—543 F **7 Claims**

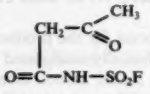
1. A process for the preparation of acetoacetamide-N-sulfofluoride of the formula (I)



(I)

which comprises reacting amidosulfofluoride (ASF), in the liquid phase, at a temperature of from 50° to 100° C with diketene, in the presence of an inert diluent or solvent which is a member selected from the group consisting of aliphatic and aromatic hydrocarbons, ethers, nitriles and halogenohydrocarbons.

7. A process for preparing acetoacetamide-N-sulfofluoride of the formula (I)



(I)

which comprises reacting amidosulfofluoride (ASF) at a temperature of from 50° to 100° C with diketene in the absence of a diluent or solvent.

4,052,454

PROCESS FOR THE MANUFACTURE OF UREAS

John G. Zajacek, Strafford; John J. McCoy, Media, both of Pa., and Karl E. Fuger, Therwil, Switzerland, assignors to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 595,474, July 14, 1975, which is a continuation-in-part of Ser. No. 416,158, Nov. 15, 1973, abandoned. This application Apr. 7, 1976, Ser. No. 674,464

Int. Cl.² C07C *127/19, 127/15*

U.S. Cl. 260—553 A **12 Claims**

1. A method for the production of ureas which comprises contacting at elevated temperatures and pressures in a basic solution a nitrogenous organic compound selected from the group consisting of organic nitro, nitroso, azo and azoxy compounds containing up to 24 carbon atoms, with carbon monoxide and water in the presence of an active amount of a catalyst selected from the group consisting of sulfur, hydrogen sulfide, carbonyl sulfide, potassium hydrogen sulfide, potassium sulfide, sodium sulfide, aluminum sulfide, ammonium sulfide, diethyl polysulfide and mixtures thereof.

4,052,455

STYRYLAMIDINES

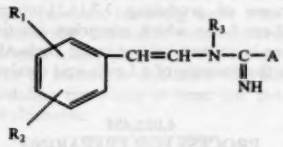
William L. Matier, and William T. Comer, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Continuation-in-part of Ser. No. 459,152, April 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 368,547, June 11, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,563

Int. Cl.² C07C *123/00*

U.S. Cl. 260—562 R **50 Claims**

1. A compound selected from the group consisting of styrylamidines having the formula



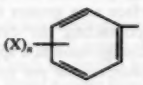
and a salt thereof of a pharmaceutically acceptable acid wherein

R_1 is selected from lower alkyl of 1 to 4 carbon atoms inclusive, hydrogen, nitro, amino, halogen, cyclohexyl, carbamoyl, lower alkylsulfonyl from 1 to 4 carbon atoms inclusive, sulfamoyl or lower alkanoylamido of from 2 to 4 carbon atoms inclusive;

R_2 is hydrogen or halogen with the proviso that when R_1 is halogen R_2 can represent up to two additional halogen;

R_3 is hydrogen, cyclopropyl or lower alkyl of 1 to 4 cabon atoms inclusive;

A is selected from lower alkyl of from 1 to 8 carbon atoms inclusive, di(lower)alkylaminophenyl, phenyl, benzyl, β-naphthyl, styryl, phenylbutadienyl, cycloalkyl of 3 to 6 carbon atoms inclusive, or a substituted phenyl radical represented by the symbol



X is selected from (lower) alkoxy from 1 to 4 carbon atoms inclusive, halogen, nitro, amino, lower alkanoylamido of from 2 to 4 carbon atoms inclusive, and

n represents the integer 1 or 2.

4,052,456

METHOD OF PREPARING POLYAMINOPOLYPHENYLMETHANES

Edward T. Marquis, and Lewis W. Watts, Jr., both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Jan. 31, 1977, Ser. No. 763,967

Int. Cl.² C07C *85/08*

U.S. Cl. 260—570 D **3 Claims**

1. A method of preparing diaminodiphenylmethane and higher homologues thereof which comprises the step of condensing aniline and formaldehyde in the presence of an aluminum silicide catalyst.

4,052,457
3,7,11,11-TETRAMETHYL-SPIRO-[5,5]UNDECA-8-ENE-1-ONE

Akira Nagakura, Kawaguchi; Michio Moroe, Musashino; Yasuto Koyama, and Haruki Kurihara, both of Tokyo, all of Japan, assignors to Takasago Perfumery Co., Ltd., Tokyo, Japan

Filed Dec. 2, 1975, Ser. No. 636,858
Claims priority, application Japan, Dec. 2, 1974, 49-138613; Dec. 2, 1974, 49-138614
Int. Cl.[2] C07C *45/00, 49/48, 49/54*
U.S. Cl. 260—586 G **5 Claims**

1. 3,7,11,11-tetramethyl-spiro[5,5]undeca-8-ene-1-one.

2. A process of producing 3,7,11,11-tetramethyl-spiro-[5,5]undeca-8-ene-1-one which comprises reacting pulegone and piperylene in an inert solvent under Diels-Alder reaction conditions in the presence of a Lewis-acid catalyst.

4,052,458
PROCESS FOR PREPARING 2-(1-CYCLOHEXENYL)-CYCLOHEXANONE

Joseph F. M. Klein, Bunde; Petrus A. M. J. Stijfs, Munstergeleen, and Jozef A. Thoma, Sittard, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Jan. 16, 1976, Ser. No. 649,575
Claims priority, application Netherlands, Jan. 17, 1975, 7500549
Int. Cl.[2] C07C *45/00*
U.S. Cl. 260—586 C **4 Claims**

1. In a process for preparing 2-(1-cyclohexenyl)-cyclohexanone including condensing cyclohexanone in the presence of a strong acid ion exchange catalyst and removing the water formed by distillation of the resulting reaction mixture, the improvement comprising conducting the condensation with a macro-porous ion exchange resin at atmospheric pressure and a temperature of about 50° to 125° C., the macro-porous ion exchange resin comprising a sulfonated copolymer of styrene having 15 to 20% by weight of divinyl benzene therein, and pores having an average pore size in excess of 100A in diameter, or an internal surface area greater than 30 square meters per gram, or both, contacting the cycohexanone with the macro-porous ion exchange resin at a space velocity from 660 to 1320 grams of cyclohexanone per gram of resin per hour, continuing the condensation such that the conversion of the cyclohexanone is maintained at 50% or less, separating the ion exchange resin from the reaction mixture and distilling the reaction mixture to remove the water formed in the absence of the ion exchange resin and recovering the 2-(1-cyclohexenyl)-cyclohexanone product.

4,052,459
PROCESS FOR THE MANUFACTURE OF ALKYLACETOPHENONES

Pierre Malfroid, Jemeppe-sur-Sambre, Belgium, assignor to Solvay & Cie, Brussels, Belgium

Filed July 9, 1975, Ser. No. 594,223
Claims priority, application France, July 16, 1974, 74.25123
Int. Cl.[2] C07C *49/78*
U.S. Cl. 260—592 **12 Claims**

1. In a process for the manufacture of alkylacetophenones wherein (1) benzene is acylated by means of an acylating agent selected from the group consisting of anhydrides and chlorides of aliphatic organic acids in order to obtain an alkylphenylketone, (2) the alkylphenylketone thus obtained is hydrogenated catalytically in order to obtain the corresponding alkylbenzene and (3) the alkylbenzene thus obtained is acetylated by means of an acetylating agent selected from the group consisting of acetic anhydride and and acetyl chloride in order to obtain the corresponding alkylacetophenone, the improvement wherein the three reactions involving (1) alkylation, (2) hydrogenation and (3) acetylation are carried out in only one solvent selected from the group consisting of chlorinated aliphatic hydrocarbons containing 1 to 3 carbon atoms and 2 or 3 chlorine atoms per molecule, and their mixtures.

4,052,460
PRODUCTION OF 3,3-DIMETHYL-2-OXO-BUTYRIC ACID SALT

Karlfried Dickoré, Leverkusen; Hans Dieter Engels, Solingen; Hans Kratzer, Wuppertal, and Walter Merz, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 20, 1976, Ser. No. 650,651
Int. Cl.[2] C07C *45/00, 49/16*
U.S. Cl. 260—593 H **2 Claims**

1. A process comprising introducing into pinacolone twice the molar amount of chlorine, the exothermic reaction mass being cooled initially to maintain the temperature below about 50° C until about 60 to 80% of the chlorine has been introduced, then heating the reaction mass during introducing of the remainder of the chlorine, with the temperature being raised during heating to a final temperature above 50° C, the temperature being kept high enough to maintain the mass in liquid state, thereby to produce dichloropinacolone, and terminating chlorine introduction when the dichloropinacolone content of the reaction mass is at least about 97%.

4,052,461
HYDROFORMYLATION PROCESS

Harold Burnham Tinker, Zurich, Switzerland, and Donald E. Morris, Kirkwood, Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 546,227, Feb. 3, 1975, abandoned, and Ser. No. 466,660, March 3, 1974, abandoned, and Ser. No. 310,621, Nov. 29, 1972, abandoned. This application Apr. 4, 1975, Ser. No. 565,167
Int. Cl.[2] C07C *47/48*; B01J *21/02*
U.S. Cl. 260—599 **29 Claims**

1. In an improved process for the production of aldehydes, by the reaction of a olefinically insaturated hydrocarbon having from 2 to 30 carbon atoms, carbon monoxide, and hydrogen at a total pressure of from 4.6 to 142 kg/cm^2, and at a temperature of from about 60° C to about 180° C, the improvement which comprises contacting the said reactants in the presence of a solution of a rhodium catalyst, in which said catalyst is provided by (1) introducing rhodium into the reaction solution in the form of an ionic rhodium compound, the said ionic compound consisting of (a) a rhodium-containing cation having rhodium comlexed with ligands selected form the group consisting of:

mono-enes of 2 to 12 carbon atoms,
dienes of 4 to 12 carbon atoms,
trienes of 6 to 16 carbon atoms,
alkynes of 2 to 12 carbon atoms,
ketones of 3 to 12 carbon atoms,
nitriles of 2 to 12 carbon atoms,
N-alkylamides of 2 to 12 carbon atoms,
N,N-dialkylamides of 3 to 12 carbon atoms,
sulfoxides of 2 to 12 carbon atoms,
tertiary phosphines and phosphites of 3 to 90 carbon atoms,
tertiary arsines and arsenites of 3 to 90 carbon atoms,
tertiary stibines and stibites of 3 to 90 carbon atoms,
carbon monoxide, and combinations thereof,

and (b) BPh_4^-; and (2) furnishing to the reaction solution at least two moles of a modifying ligand per mole of ionic rhodium compound where the modifying ligand is furnished either pre-coordinated in the said ionic rhodium compound or as a free compound; and where the modifying ligand, is selected from the group consisting of tertiary phosphines and phosphites, arsines and arsenites, stibines, and stibites, having from 3 to 90 carbon atoms.

4,052,462
CATALYST COMPOSITION FOR OXIDATION OF OLEFINS

Kouzou Sakakibara; Iwao Abe; Takushi Yokoyama, and Kazuyuki Matuokadeclare, all of Saitama, Japan, assignors to Daicel Ltd., Osaka, Japan

Continuation of Ser. No. 363,521, May 24, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,358
Claims priority, application Japan, June 9, 1972, 47-57421
Int. Cl.² C07C 45/16
U.S. Cl. 260—604 R 7 Claims

1. In a process for preparing an α,β-unsaturated aldehyde by the gas phase catalytic oxidation of the corresponding α,β-unsaturated olefinic hydrocarbon, which comprises contacting a gas phase mixture of said olefinic hydrocarbon and molecular oxygen, with a catalyst composition consisting essentially of a carrier having deposited thereon a mixture of at least two metal oxides, at least one of which is molybdenum oxide in an amount of at least about 25% by weight, based on the total metal oxides, and the other metal oxide or metal oxides also being present in an amount of at least 25% by weight, based on the total metal oxides, the improvement which comprises; the carrier of said catalyst composition consists of silica having a specific surface area of 250 m^2/g up to 700 m^2/g, the catalyst composition has a specific surface area in the range of from 150 m^2/g to 200 m^2/g, and the reaction temperature is in the range of from about 310° to about 340° C.

4,052,463
PROCESS FOR PREPARING TERTIARY PHOSPHINE SULFIDES AND OXIDES

Eugene H. Uhing, Pleasantville, N.Y., and Arthur D. F. Toy, Stamford, Conn., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Oct. 6, 1975, Ser. No. 619,744
Int. Cl.² C07F 9/53
U.S. Cl. 260—606.5 P 7 Claims

1. A method of preparing compounds of the formula:

(I)

wherein $R^{(1,2)}$ is selected from the group consisting of C_1 to C_7 alkyl; the aryl substituted derivatives thereof, said aryl substituted derivatives having 1 or 2 fused rings; cycloalkyl of 5 – 6 carbons in the ring; aryl of up to 3 fused rings; biphenyl and the C_1 to C_4 alkyl substituted derivatives of said cycloalkyl, aryl and biphenyl and Z is selected from the group consisting of sulfur and oxygen, provided that when Z is oxygen $R^{(1,2)}$ is methyl, comprising contacting under at least an autogenous pressure at a temperature of from about 200° C. to about 400° C. a reactant of the formula:

$$R^1ZR^2 \qquad \text{(II)}$$

wherein R^1 and R^2 are the same or different and have the same definition as $R^{(1,2)}$ as defined above and Z is as defined above, with elemental phosphorus in the presence of a catalyst selected from the group consisting of iodine, alkyl halide, aryl halide and iodide salt.

4,052,464
PROCESS FOR THE MANUFACTURE OF DI-T-BUTYLPEROXY KETALS

Duane B. Priddy, Coleman, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed July 21, 1975, Ser. No. 597,792
Int. Cl.² C07C 179/06
U.S. Cl. 260—610 C 3 Claims

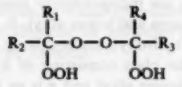
1. In a method for the preparation of ethylbenzene soluble di-t-butylperoxy ketals from a ketone and tertiarybutyl hydroperoxide in the presence of an acidic catalyst wherein the ketone and tertiarybutyl hydroperoxide in a molar ratio of 1:2½ to 1:4 and acidic catalyst such as sulfuric acid, para-toluene sulfonic acid, phosphoric acid, dodecylbenzenesulfonic acid, dodecylphosphoric acid, oxalic acid are dispersed in a solvent at a temperature 30°–80° C below the decomposition temperature of the desired di-t-butylperoxy ketals and under a pressure from 20 to 100 millimeters mercury, a pressure sufficiently low that water is removed from the reaction mixture and condensed at a location remote from the reaction mixture to thereby convert at least a major portion of the ketone to the corresponding di-t-butylperoxy ketals, the improvement which comprises employing ethylbenzene in proportions of about 1 to 10 times by weight of the ketone as the solvent conducting the reaction in the presence of an excess of tertiarybutyl hydroperoxide, removing water from the reaction mixture by azeotropic distillation with ethylbenzene and removing at least a major portion of the excess tertiarybutyl hydroperoxide by azeotropic distillation with ethylbenzene to provide a solution containing at least one di-t-butylperoxy ketal and ethylbenzene.

4,052,465
PREPARATION OF ORGANIC PEROXIDES

Lodewijk Roskott, Gorssel, and Arnold Schroeder, Deventer, both of Netherlands, assignors to Akzona, Incorporated, Asheville, N.C.

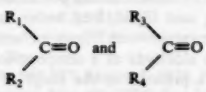
Filed Dec. 18, 1973, Ser. No. 425,856
Claims priority, application United Kingdom, Dec. 22, 1972, 59395/72
Int. Cl.² C07C 179/02, 179/06
U.S. Cl. 260—610 R 10 Claims

1. A process for preparing an organic peroxidic composition, consisting essentially of a compound having the general formula



wherein R_1 and R_4 each are selected from the group consisting of hydrogen and a lower alkyl group, R_2 and R_3 may be the same or different and each is selected from the group consisting of branched alkyl group having from 1 to 12 carbon atoms, an unbranched alkyl group having from 1 to 12 carbon atoms, a branched alkyl group having from 1 to 12 carbon atoms substituted with a group selected from the group consisting of hydroxy, lower alkoxy, lower alkoxycarbonyl, halogen and phenyl, an unbranched alkyl group having from 1 to 12 carbon atoms substituted with a group selected from the group consisting of hydroxy, lower alkoxy, lower alkoxycarbonyl, halogen and phenyl; phenyl, phenyl substituted with a group selected from the group consisting of lower alkoxy and halogen, and wherein R_1 together with R_2, R_3 together with R_4 form a branched or unbranched alkylene group having a total 12 carbon atoms and 5 or 6 carbon atoms in the nucleus, and wherein R_1 together with R_4 form a lower alkylene group, comprising

reacting carbonyl compounds having the formulae



wherein the symbols R_1, R_2, R_3 and R_4 have the meanings as defined, with hydrogen peroxide

in an organic solvent, which forms an azeotrope with water and wherein both the starting carbonyl compound and the peroxidic composition formed are substantially soluble, said solvent being other than the starting carbonyl compound,

in the presence of an acid catalyst selected from the group consisting of mineral acids, strong organic acids, and strong acid ion exchangers, in an amount of 0.2–200 mg equivalent per mole of said carbonyl compounds,

at a temperature of 10°–50° C.

while simultaneously removing water by distillation under reduced pressure.

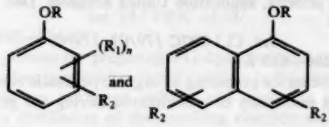
4,052,466

PROCESS FOR THE PREPARATION OF BISPHENOL-A

Kwok K. Sun, Hamden, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sept. 27, 1976, Ser. No. 726,835
Int. Cl.² C07C *37/20, 37/00, 39/16*
U.S. Cl. 260—619 A **25 Claims**

1. In a process for the preparation of Bisphenol A by condensing phenol and acetone in the presence of acidic catalyst the improvement which comprises employing as cocatalyst, in an amount from 0.1 to 10 moles percent based on phenol, a member selected from the group consisting of compounds of the formulae:



wherein R and R_2 are independently selected from the class consisting of hydrogen and lower-alkyl, R_1 is selected from the class consisting of hydroxyl, lower-alkoxy and lower-alkyl, R_3 is selected from the class consisting of hydrogen, hydroxyl, lower-alkoxy and lower-alkyl and *n* is an integer from 1 to 2.

4,052,467

CATALYTIC REDUCTION OF ALDEHYDES TO ALCOHOLS

King L. Mills, and Roy V. Denton, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 681,590, Nov. 8, 1967, abandoned. This application Sept. 18, 1970, Ser. No. 73,584
Int. Cl.² C07C *29/14, 29/24, 29/16*
U.S. Cl. 260—638 B **7 Claims**

1. A process for reducing an aldehyde to the corresponding alcohol in a hydroformylation process derived liquid feed containing at least 1 weight percent of said aldehyde and further containing at least 10 ppm and up to 1 weight percent of sulfur in the form of ring-type sulfur compounds, said aldehyde containing up to 30 carbon atoms per molecule, which comprises contacting said liquid feed under substantially liquid conditions in admixture with H_2 in an amount sufficient to hydrogenate said aldehyde at a temperature in the range of 450° to 550° F., a pressure in the range of 800 to 1200 psig sufficient to maintain substantially a liquid phase, and a liquid hourly space rate in the range of 1.0 to 1.5, with a catalyst comprising a mixture of the oxides or hydroxides of Zn and Cu reduced by treatment with CO, H_2, or mixture, wherein said catalyst initially contains 40 to 90 weight percent ZnO and 60 to 10 weight percent CuO exclusive of support, if any, prior to said reduction, and wherein said treatment with CO, H_2, or mixture is conducted at about 400° F. to 800° F.

4,052,468

PROCESS FOR THE PRODUCTION OF CHLOROFLUORINATED CYCLOALIPHATIC HYDROCARBONS

James Oliver Peterson, Snyder; Bernard Sukornick, Williamsville; Richard Francis Sweeney, Elma; Henry R. Nychka, East Aurora; Richard E. Eibeck, Orchard Park, all of N.Y., and Morris B. Berenbaum, Summit, N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Dec. 22, 1975, Ser. No. 642,835
Int. Cl.² C07C *23/06*
U.S. Cl. 260—648 F **57 Claims**

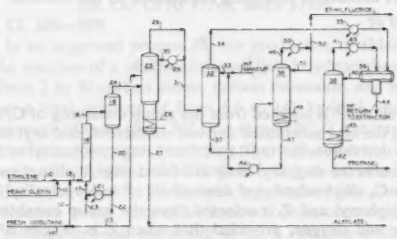
1. The process for the production of chlorofluorinated cycloaliphatic hydrocarbons which comprises reacting a gaseous mixture of a starting material selected from a cycloaliphatic hydrocarbon and a cycloaliphatic hydrohalocarbon in which the halo atoms are selected from chloro and fluoro, or mixtures thereof, at least .25 mole oxygen in an oxygen-containing gas for each C—H bond in the starting material, at least 0.50 mole HCl or equivalent amount of Cl_2 for each C—H bond and C=C bond present in the starting material, and HF, in the presence of a Deacon catalyst supported by a stable, inert metal salt carrier, with the weight percentage of cation in the Deacon catalyst ranging from about 0.6–20 based on the total cation content of the Deacon catalyst and metal salt carrier, at elevated temperatures and with a contact time of from about 0.1–20 seconds.

4,052,469

ETHYLFLUORIDE PRODUCTION

Thomas Hutson, Jr., and Cecil O. Carter, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 16, 1975, Ser. No. 578,041
Int. Cl.² C07C *19/08*
U.S. Cl. 260—653.6 **9 Claims**



1. A process for the production of ethylfluoride which comprises reacting ethylene with hydrogen fluoride under conditions which produce ethylfluoride as the major or primary product and in the presence of at least one heavier C_3 and C_4 olefin in a minor amount ranging from 0.01 to 30 weight percent of the total olefin present which is sufficient to increase the conversion and improve the selectivity of the reaction.

4,052,470

PROCESS FOR THE PRODUCTION OF CHLOROFLUORINATED ACYCLIC HYDROCARBONS

Henry R. Nychka, East Aurora; Richard E. Eibeck, Orchard Park, both of N.Y., and Morris B. Berenbaum, Summit, N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Dec. 22, 1975, Ser. No. 642,874
Int. Cl.² C07C *19/08*
U.S. Cl. 260—653.7 **74 Claims**

1. The process for the production of chlorofluorinated acyclic hydrocarbons which comprises reacting a gaseous mixture of a starting material selected from an acyclic hydrocarbon containing up to four carbon atoms and an acyclic hydrohalo-

carbon containing up to four carbon atoms in which the halo atoms are selected from chloro and fluoro, or mixtures thereof, at least 0.25 mole oxygen in an oxygen-containing gas for each C-H bond in the starting material, at least 0.50 mole HCl or equivalent amount of Cl_2 for each C-H bond and C=C bond present in the starting material, and HF, in the presence of a Deacon catalyst supported by a stable, inert metal salt carrier, with the weight percentage of cation in the Deacon catalyst ranging from about 0.6–20 based on the total cation content of the Deacon catalyst and metal salt carrier, at elevated temperatures and with a contact time of from about 0.1–20 seconds.

4,052,471

PROCESS FOR CHLORINATING C_6 TO C_{30} LINEAR HYDROCARBONS

Mason P. Pearsall, Houston, Tex., assignor to Pearsall Chemical Corporation, Houston, Tex.

Filed Aug. 6, 1975, Ser. No. 602,244
Int. Cl.² C07C *17/02, 17/08, 17/10*
U.S. Cl. 260—660 **9 Claims**

1. A process for chlorinating hydrocarbons comprising:
intimately mixing a substantially linear liquid long chain hydrocarbon having 8 to 30 carbon atoms with water in a weight ratio of 0.09:1 to 10:1,
feeding said mixture of hydrocarbon and water to a reactor,
adding 2 to 20 moles chlorine per mole of hydrocarbon to said mixture in countercurrent flow to said mixture at a rate of 20 to 600 grams per hour per kilogram of hydrocarbon,
contacting said hydrocarbon, water and chlorine for from 0.5 to 10 hours at a temperature in the range of 50° to 150° C and
separating an organic phase containing chlorinated hydrocarbons.

4,052,472

MORDENITE CONVERSION OF ALKANOLS TO PENTA- AND HEXAMETHYL BENZENES

Edwin Neil Givens, Pitman; Charles Joseph Plank, Woodbury, and Edward Joseph Rosinski, Pedricktown, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,771
Int. Cl.² C07C *1/20*
U.S. Cl. 260—668 B **8 Claims**

1. A method for converting aliphatic oxygenated organic compounds to hydrocarbon mixtures, which comprises: contacting a feed comprising one or more oxygenated organic compounds selected from the group consisting of methanol and methyl ethers of the lower alkanols with a mordenite catalyst having a silica to alumina ratio greater than 15 and a constraint index of less than about 1, said contacting being at a temperature from about 500° F to about 850° F, a pressure of 0.1 atmosphere to 50 atmospheres, and a W.H.S.V. of 0.1 to 30; and converting at least about 80% of said oxygenated organic compounds to water and a hydrocarbon mixture containing less than 10 weight percent methane and more than about 50% of C_9, C_{10} and heavier aromatics.

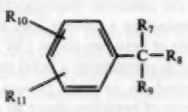
4,052,473

PROCESS FOR PRODUCING LIQUID POLYMER

Yoshiharu Yagi, Toyonaka; Seimei Yasui, Ibaraki; Hiroshi Sato, Takatsuki; Takanobu Noguchi, Takatsuki, and Michio Yamamoto, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Division of Ser. No. 425,701, Dec. 18, 1973, abandoned. This application Nov. 24, 1975, Ser. No. 634,508
Claims priority, application Japan, Mar. 9, 1973, 48-28142
Int. Cl.² C07C *3/10*
U.S. Cl. 260—669 P **11 Claims**

1. A process for producing a liquid polymer of isoprene or a copolymer or isoprene and an aromatic vinyl compound having a molecular weight of at least 200 which comprises polymerizing isoprene or copolymerizing isoprene with an aromatic vinyl compound in the presence of 0.01 to 100 moles of ethylene, propylene or a mixture thereof, per mole of isoprene, and in the presence of a catalyst system comprising:
1. at least one nickel compound selected from the group consisting of a nickel salt of a carboxylic acid, nickel chloridepyridine complex, trisdipyridylnickel chloride, bisethylenediaminenickel sulfate, bisacetylacetonatonickel, bis(ethyl acetoacetato)nickel, bisdimethylglyoximatonickel, bis(π-allyl)nickel, bis(π-methallyl)nickel, bis(π-crotyl)nickel, bis(π-cyclooctenyl)nickel, bis(π-cyclopentenyl)nickel and tetracarbonyl nickel, and
2. at least one organometallic compound selected from the group consisting of:
a. an alkylaluminum halide of the formula: R_nAlX_{3-n} wherein R is alkyl or alkylaryl having 1 to 20 carbon atoms or phenyl, X is chlorine, bromine, or iodine and n is 1 or 2, and
b. a combination of (b_1) at least one compound selected from the group consisting of (i) an organoaluminum compound of the formula $AlR_1R_2R_3$, wherein R_1 is hydrogen, fluorine, alkyl, cycloalkyl, aryl or aralkyl and R_2 R_3 are each alkyl, cycloalkyl, aryl or aralkyl; (ii) an organomagnesium or organozinc compound of the formula $(R_4)_2M$, wherein M is magnesium or zinc and R_4 is alkyl, cycloalkyl, aryl or aralkyl; and (iii) an organolithium compound of the formula R_5Li, wherein R_5 is alkyl, cycloalkyl, aryl or aralkyl, and (b_2) at least one halogen compound selected from the group consisting of (i) a chloride, bromide or iodide of a metal belonging to Group III, IV, V or VI in the Periodic Table, or an ether complex, ester complex or aldehyde complex thereof; (ii) is hydrogen halide or the formula HX, wherein X is chlorine, bromine or iodine; (iii) on alkylmetal halide of the formula $(R_6)_nMX_{3-n}$, wherein M is a metal of Group III or IV in the Periodic Table, R_6 is alkyl, X is chlorine, bromine or iodine and n is 1 or 2; (iv) a halide of an aliphatic or alicyclic hydrocarbon; (v) a compound of the formula:



wherein R_7 is chlorine, bromine or iodine, R_8 and R_9 are each hydrogen, chlorine, bromine, iodine, lower alkyl or phenyl and R_{10} and R_{11} are each hydrogen, halogen, lower alkyl or halogen-substituted lower alkyl; (vi) an alkynyl halide; (vii) a ketone containing chlorine or bromine; and (viii) a halogen-containing allyl compound of the formula $R_{12}CH{=}CHCH_2X$, wherein R_{12} is hydrogen or an aliphatic hydrocarbon having 1 to 6 carbon atoms and X is chlorine, bromine or iodine.

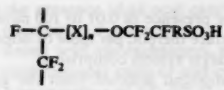
4,052,474

TOLUENE DISPROPORTIONATION PROCESS USING AN UNSUPPORTED PERFLUORINATED POLYMER CATALYST

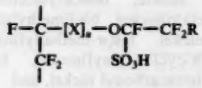
James D. McClure, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 663,897, March 4, 1976, Pat. No. 4,022,847. This application Dec. 20, 1976, Ser. No. 752,351
Int. Cl.² C07C *3/62*
U.S. Cl. 260—672 T **3 Claims**

1. A process for the catalytic disproportionation of toluene which comprises contacting a toluene feed stream in a reaction zone at a temperature of between about 150° C and 225° C with an unsupported solid perfluorinated polymer catalyst wherein said catalyst contains a repeating structure selected from the group of:



or



where n is 0, 1 or 2; R is a radical selected from the group consisting of fluorine and perfluoroalkyl radicals having from 1 to 10 carbon atoms; and X is selected from the group consisting of:

$[O(CF_2)_m]$, $[OCF_2CFY]$ or $[OCFYCF_2]$

where m is an integer from 2 to 10 and Y is a radical selected from the class consisting of fluorine and the trifluoromethyl radical.

4,052,475

TOLUENE DISPROPORTIONATION PROCESS USING A SUPPORTED PERFLUORINATED POLYMER CATALYST

James D. McClure, and Stanley G. Brandenberger, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

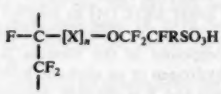
Division of Ser. No. 663,956, March 4, 1976. This application Apr. 1, 1977, Ser. No. 783,908

Int. Cl.[2] C07C *3/62*

U.S. Cl. 260—672 T **7 Claims**

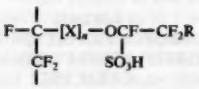
1. A process for the catalytic disproportionation of toluene which comprises contacting a toluene feed stream in a reaction zone at a temperature of between about 150° C and 225° C with a catalyst composition comprising a solid perfluorinated polymer catalyst supported on an inert porous carrier having an average pore diameter of between about 50 A and about 600 A in a weight ratio of catalyst to support of between about 0.1:100 and about 20:100 wherein said catalyst contains a repeating structure selected from the group of:

a)



or

b)



where n is 0, 1 or 2; R is a radical selected from the group consisting of fluorine and perfluoroalkyl radicals having from 1 to 10 carbon atoms; and X is selected from the group consisting of:

$[O(CF_2)_m]$, $[OCF_2CFY]$ or $[OCFYCF_2]$

where m is an integer from 2 to 10 and Y is a radical selected from the class consisting of fluorine and the trifluoromethyl radical.

4,052,476

TOLUENE DISPROPORTIONATION OVER ZEOLITE CATALYST

Roger A. Morrison, West Deptford, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 571,122, April 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 431,519, Jan. 7, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,411

Int. Cl.[2] C07C *3/62*

U.S. Cl. 260—672 T **23 Claims**

1. A process for effecting vapor-phase disproportionation of toluene which comprises contacting toluene with a catalyst composition comprising a crystalline aluminosilicate zeolite characterized by a silica/alumina mole ratio of greater than 12 and a constraint index within the approximate range of 1 to 12 and containing cations which are predominately hydrogen, hydrogen precursor and/or a non-noble metal of Group VIII of the Periodic Table of Elements, said toluene having been dried prior to said contacting, under conditions effective for accomplishing said vapor-phase disproportionation including a reactor inlet temperature between about 650° F and about 1100° F, a hydrogen to hydrocarbon mole ratio of between 0 and about 4, a reactor pressure between atmospheric and about 1000 psig and a weight hourly space velocity of between about 1 and about 20, whereby from about 40 to about 50 weight percent of said toluene is disproportionated and the approach to equilibrium for para-xylene in the process is greater than 100%.

4,052,477

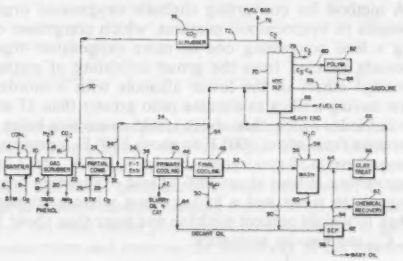
METHOD FOR UPGRADING A FISCHER-TROPSCH LIGHT OIL

Henry R. Ireland, Woodbury; Alan W. Peters, and Thomas R. Stein, both of Cherry Hill, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 7, 1976, Ser. No. 684,511

Int. Cl.[2] C07C *1/02*

U.S. Cl. 260—676 R **12 Claims**



1. A method for upgrading the C_5+ liquid product of a Fischer-Tropsch synthesis having an end point from about 340°–400° F which comprises hydrogenating said liquid in the presence of a hydrogenation catalyst component at conditions of temperature and pressure so as the selectively hydrogenate substantially only the diolefins contained therein and thereafter contacting said liquid at a temperature within the range of about 575° to about 850° F and at a pressure within the range of from about atmospheric to 700 psig with a crystalline aluminosilicate catalyst component characterized by a pore dimension greater than about 5 Angstroms, a silica to alumina ratio of at least 12, and a constraint index within the range of 1:12 said catalyst being presulfided prior to use, and recovering a gasoline boiling range product having an enhanced octane number.

4,052,478

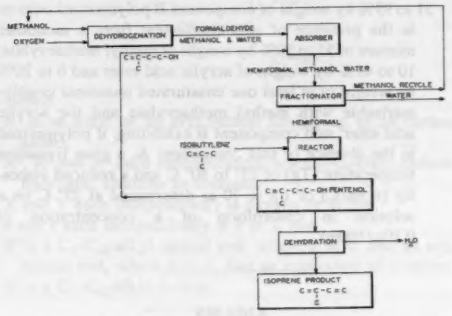
METHOD FOR PREPARATION OF ALKYL-SUBSTITUTED BUTADIENES

Harold M. Hawkins, deceased, late of Bartlesville, Okla., by Marjorie W. Hawkins, executrix, assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 617,755, Sept. 29, 1975, Pat. No. 3,993,702. This application June 24, 1976, Ser. No. 699,548

Int. Cl.² C07C 1/24

U.S. Cl. 260—681 **21 Claims**

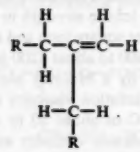


1. A method for the preparation of alkyl-substituted butadienes which comprises the steps:

a. oxidizing a lower alkanol at least in part to the corresponding lower aldehyde,

b. contacting said lower aldehyde with an aliphatic hydrocarbyl monoolefinic alcohol, thereby forming a hemialdehyde,

c. contacting said hemialdehyde with an aliphatic hydrocarbyl isomonoolefin represented by:



wherein each R is hydrogen or a saturated hydrocarbon aliphatic radical of up to 3 carbon atoms per R group, under reaction conditions, thereby forming said aliphatic hydrocarbyl monoolefinic alcohol,

d. recycling a portion of said aliphatic monoolefinic alcohol to said contacting step (b), and

e. dehydrating under dehydration conditions at least a further portion of said aliphatic monoolefinic alcohol under dehydration conditions, thereby forming said alkyl-substituted butadiene.

4,052,479

CONVERSION OF METHANOL TO OLEFINIC COMPONENTS

Clarence D. Chang, Princeton; William H. Lang, Pennington, both of N.J., and Anthony J. Silvestri, Morrisville, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 387,222, Aug. 9, 1973, Pat. No. 3,894,106, and a continuation-in-part of Ser. No. 537,043, Dec. 27, 1974, abandoned. This application May 13, 1976, Ser. No. 686,445

The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.

Int. Cl.² C07C 1/24

U.S. Cl. 260—682 **6 Claims**

1. A method for producing olefins from a feed selected from the group consisting of lower alcohols, one or more ether dehydration products of lower alcohols and mixtures of one or more lower alcohols and an ether derivative thereof which comprises passing said feed in contact with a crystalline aluminosilicate zeolite having a pore dimension greater than about 5 Angstroms, a silica to alumina ratio of at least about 12, and a constraint index of about 1 to 12, said contact being carried out at a temperature within the range of 500–900° F, a pressure from atmospheric up to about 100 psi, a space velocity of 50–1000 LHSV, said temperature and space velocity being selected within said ranges so as to restrict conversion of the feed within the range of 5 to 25%, and recovering an olefin product.

4,052,480

HIGH SOLIDS COATING COMPOSITIONS CONTAINING LIQUID BISHYDROXY PROPYL ETHER OF A BISPHENOL

Kazys Sekmakas, Chicago, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed June 23, 1976, Ser. No. 698,851

Int. Cl.² C08L 61/26, 61/20

U.S. Cl. 260—856 **8 Claims**

1. A fluid resinous coating composition containing less than about 30% of volatile organic solvent and which cures on baking, said coating composition consisting essentially of a mixture of:

1. a copolymer of monoethylenic monomers including from about 5–20% of monoethylenic monomer having a functional group reactive with the N-methylol group and selected from carboxylic acid, hydroxy, and amide groups, said copolymer being produced by copolymerization in an organic solvent solution containing a major proportion of component (2) below;
2. liquid bishydroxy propyl ether of a bisphenol formed by reacting propylene oxide with a bisphenol; and
3. an aminoplast resin;

said copolymer constituting from about 4.5% to 35% of the mixture, the bishydroxy propyl ether constituting from about 20% to 40% of the mixture, and the balance of the mixture of the three components consisting essentially of aminoplast resin, there being at least about 0.8 parts of aminoplast resin per part of copolymer, and said copolymer being present in an amount of from about 15–80% of the weight of the bishydroxy propyl ether.

4,052,481

RESIN COMPOSITION AND A PROCESS FOR PREPARING SAME

Nakaba Asahara; Yasuhiko Asai, and Kenji Yasue, all of Uji, Japan, assignors to Unitika Ltd., Amagasaki, Japan

Filed Oct. 14, 1976, Ser. No. 732,695

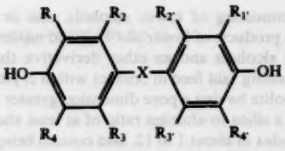
Claims priority, application Japan, Oct. 15, 1975, 50-124798; Apr. 12, 1976, 51-41635

Int. Cl.² C08L 77/00

U.S. Cl. 260—857 PE **18 Claims**

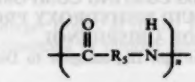
1. A resin composition comprising:

A. 1 to 98.9% by weight, based on the resin composition, of an aromatic copolyester comprising the reaction product in about equi-molar amounts of (1) terephthalic acid and isophthalic acid and/or the functional derivatives thereof, wherein the terephthalic acid unit/isophthalic acid unit molar ratio ranges from about 9:1 to about 1:9, and (2) a bisphenol of the following general formula

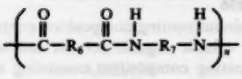


wherein —X— represents a member selected from group consisting of —O—, —S—, —SO_2—, —SO—, —CO—, and alkylene and alkylidene groups containing 1 to 4 carbon atoms, and each of R_1, R_2, R_3, R_4, R_1', R_2', R_3' and R_4' is selected from the group consisting of a hydrogen atom, a chlorine atom, a bromine atom and an alkyl group containing 1 to 4 carbon atoms, or a derivative thereof;

B. 1 to 98.9% by weight, based on the resin composition, of a polyamide of the following general formula:

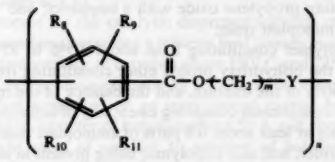


or



wherein R_5, R_6 and R_7 each represents an alkylene group containing 4 to 11 carbon atoms and n is an integer of from 30 to 500; and

C. 0.1 to 98% by weight, based on the resin composition, of a polyalkylene phenylene ester or polyalkylene phenylene ester ether of the following formula:



wherein R_8, R_9, R_{10} and R_{11} each represents a member selected from the group consisting of a hydrogen atom, a chlorine atom, a bromine atom and an alkyl group containing 1 to 4 carbon atoms, m is an integer of from 1 to 10, n is an integer of from 30 to 500. Y is an ester unit or an ether unit.

4,052,482

VINYL CHLORIDE POLYMER COMPOSITION

Fumio Ide; Kazuo Kishida, and Akira Hasegawa, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 427,550, Dec. 26, 1973, abandoned. This application Nov. 21, 1975, Ser. No. 634,284

Claims priority, application Japan, Dec. 29, 1972, 48-1161; Mar. 13, 1973, 48-28594

Int. Cl.² C08L *31/02, 51/00*

U.S. Cl. 260—876 R **5 Claims**

1. A thermoplastic vinyl chloride polymer composition of improved processability which comprises

1. 70 to 99.9 parts by weight of polyvinyl chloride or a copolymer of no less than 80% by weight of vinyl chloride and no greater than 20% by weight of at least one other copolymerizable ethylenically unsaturated monomer, and

2. 0.1 to 30 parts by weight of a two stage sequentially produced methyl methacrylate composite polymer consisting essentially of

1 to 49% by weight of component A polymerized from a monomer or a monomer mixture of 90 to 100% by weight of methyl methacrylate and 0 to 10% by weight of at least one copolymerizable unsaturated monomer, said component A having a glass transition temperature (tg) of at least 75° C and a reduced viscosity (η sp/C) of 1.8 to approximately 10 as determined at 25° C on a solution in chloroform of a concentration of 0.10g/100ml, and ;

51 to 99% by weight of component B polymerized onto or in the presence of said component from a monomer mixture of 55 to 90% by weight of methyl methacrylate, 10 to 45% by weight of acrylic acid ester and 0 to 20% by weight of at least one unsaturated monomer copolymerizable with methyl methacrylate and the acrylic acid ester, said component B exhibiting, if polymerized in the absence of said component A, a glass transition temperature (Tg) of 25° to 80° C and a reduced viscosity (η sp/C) of 1.8 to 10 as determined at 25° C on a solution in chloroform of a concentration of 0.10g/100ml.

4,052,483

ADHESIVE COMPOSITION AND BUTADIENE, STYRENE, ACRYLONITRILE COPOLYMER THEREFOR

George W. Feeney, Akron, and Gary L. Burroway, Doylestown, both of, OH, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 528,299, Nov. 29, 1974, Pat. No. 3,970,623. This application May 21, 1976, Ser. No. 688,642

Int. Cl.² C08L *47/00, 9/00*

U.S. Cl. 260—880 R **3 Claims**

1. A copolymer of butadiene, styrene and acrylonitrile, suitable for use in a pressure sensitive adhesive, characterized by having an ultimate tensile strength in the range of about 50 to about 100 pounds per square inch and an ultimate elongation in the range of about 600 to about 1200 percent at 25°0 C., and further characterized by a Mooney plasticity of about 25 to about 85, a benzene solution viscosity at a 4 weight percent concentration at 25° C of about 10 to about 100 centipoises (cps) and a hexane solution viscosity at a 10 weight percent concentration at 25° C of about 200 to about 2000cps, prepared by the method which comprises (1) aqueous emulsion free radical polymerizing in the presence of a modifier composed of primary and/or tertiary mercaptans, a monomer mixture comprising about 3 to about 8 weight percent styrene, about 97 to about 92 weight percent 1,3-butadiene and about 1 to about 4 weight percent acrylonitrile based on 100 weight percent monomer mixture to a conversion of about 50 to about 75 weight percent of said monomers to a copolymer thereof, and (2) reacting an additional amount of about 2 to about 5 weight percent styrene, based on the total monomers used, with said copolymer to an extent of about 80 to about 98 weight percent conversion of the total monomers to a copolymer thereof, with additional mercaptan modifier.

4,052,484

SUBSTITUTED CYCLIC PHOSPHINE OXIDES

Reinhard Schliebs, and Hans-Dieter Block, both of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

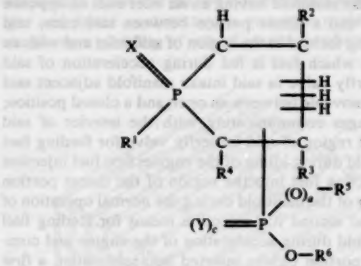
Filed Jan. 13, 1976, Ser. No. 648,710

Claims priority, application Germany, Feb. 1, 1975, 2504333

Int. Cl.² C07F *9/32, 9/48*

U.S. Cl. 260—927 R **2 Claims**

1. A cyclic phosphine oxide of the formula



in which

R^1 is an alkyl or an aryl radical having up to 14 carbon atoms,

R^2, R^3 and R^4 each independently is a C_1–C_4-alkyl radical, hydrogen, chlorine or bromine,

X and Y each independently is oxygen or sulfur,

a and c each independently is 0 or 1, and

R^5 is a C_1–C_{12}-alkyl radical and, where $a = 0$, also an aryl radical and, where $a = 1$, also an equivalent of a cation,

R^6 is a C_1–C_{12}-alkyl radical.

4,052,485

PERFLUORO COMPOUNDS CONTAINING PHOSPHORUS

Helmut Huber-Emden, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

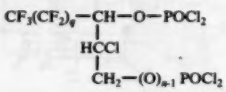
Filed Feb. 18, 1972, Ser. No. 227,661

Claims priority, application Switzerland, Feb. 25, 1971, 2731/71; Dec. 29, 1971, 19121/71

Int. Cl.² C07F *9/14, 9/42*

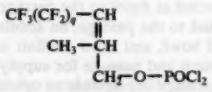
U.S. Cl. 260—928 **2 Claims**

1. Perfluoro compounds containing phosphorus, of the formula



wherein q denotes an integer having a value of 5 to 13 and n is 1 or 2.

2. Perfluoro compounds containing phosphorus, of the formula



wherein q is an integer having a value of 5 to 13.

4,052,486

PROCESS FOR PREPARING CYCLIC PHOSPHINIC ACID ESTERS

Manfred Finke, Fischbach, Taunus, and Hans-Jerg Kleiner, Kronberg, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

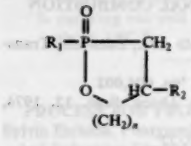
Continuation-in-part of Ser. No. 534,277, Dec. 19, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,745

Claims priority, application Germany, Apr. 5, 1975, 2514871

Int. Cl.² C07F *9/15*

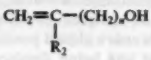
U.S. Cl. 260—970 **13 Claims**

1. A process for preparing a cyclic phosphinic acid ester of the formula



wherein R_1 is an alkyl of up to 18 carbon atoms, phenyl or phenyl substituted by alkyl, halogen or alkylated amino, R_2 is hydrogen or has the same meaning as R_1 and n is 1 or 2, which comprises reacting a phosphinic acid monoester of the formula

wherein R_3 is an alkyl of up to 8 carbon atoms, or an alkyl of up to 8 carbon atoms substituted by chlorine, with an alkenol of the formula



in the presence of a catalytic quantity of a free radical forming agent at a temperature of from 100° C to 190° C.

4,052,487

DIOL-PHOSPHONATES

Georges L. Sturtz, Brest; Serge L. Lecolier, Janville-sur-Juine; Jean-Claude Clement, Brest, and Jean Marie Biehler, Brunstatt, all of France, assignors to Societe Nationale des Poudres et Explosifs, France

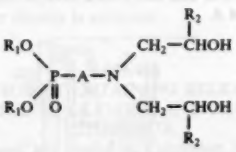
Filed Apr. 22, 1975, Ser. No. 570,413

Claims priority, application France, May 13, 1974, 74.16477

Int. Cl.² C07F *9/40;* C08J *9/00*

U.S. Cl. 260—945 **6 Claims**

1. A compound of the formula:

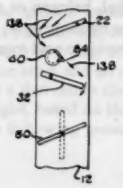


in which R_1 is an alkyl group with 1 to 4 carbon atoms, R_2 is hydrogen, methyl, or ethyl, and A is —CH_2—CH_2—CH_2—, or

4,052,488
SUPPLYING FUEL TO INTERNAL COMBUSTION ENGINES

Marthinus Johannes Schoeman, 13-14th Ave., Edenvale, Transvaal Province, South Africa

Filed Aug. 12, 1975, Ser. No. 604,002
Claims priority, application South Africa, Sept. 12, 1974, 74/5824
Int. Cl.² F02M 7/22
U.S. Cl. 261—18 A 13 Claims



1. A carburetor for an internal combusion engine including a duct connectable to a combustion charge inlet of the engine and having opposed internal wall portions which are parallel,

a. a vacuum inducing vane pivotally mounted about an offset pivot axis within the duct near the upstream end thereof, being biased by biasing means towards a closed position to impede airflow through the duct and being displaceable against the biasing means by airflow through the duct, thereby, during operation, to create a negative pressure downstream thereof;

b. a fuel control vane mounted to be displaceable by the airflow through the duct;

c. a control valve and a regulating valve, the valves being connected in series and being located transversely to the axis of the duct in opposed end to end relationship, the control valve being connectable to a fuel source and the regulating valve having a fuel outlet for feeding fuel into the duct, said outlet being located downstream of the vacuum inducing vane and within the concentrated airstream resulting from the airflow deflected by the vacuum inducing vane;

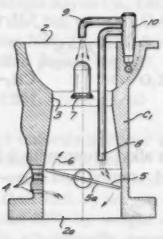
d. means linking the regulating valve to the fuel control vane so that the regulating valve is controllable in response to movement of the fuel control vane;

e. a butterfly valve in the duct operable by a throttle linkage and means operably connecting the butterfly valve with the control valve.

4,052,489
CARBURETOR CIRCUIT FOR INTERNAL COMBUSTION ENGINES

Roberto Jose Frey, Rua Guapore, 450, Sao Paulo, S.P., Brazil

Filed Apr. 12, 1976, Ser. No. 675,807
Claims priority, application Brazil, May 15, 1975, 5500450
Int. Cl.² F02M 7/08
U.S. Cl. 261—34 A 5 Claims

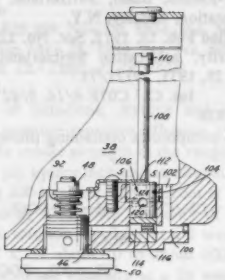


1. In a carburetor circuit for an internal combustion engine, a combination comprising a carburetor having wall means defining an intake manifold having an air inlet end, an opposite discharge end, and a throat portion between said ends, said wall means being formed in the region of said inlet end with an outlet through which fuel is fed during acceleration of said engine; a butterfly valve in said intake manifold adjacent said discharge end movable between an open and a closed position; fuel feed passages communicating with the interior of said manifold in the region of said butterfly valve for feeding fuel into the manifold during idling of the engine; first fuel injection means for injecting fuel into the region of the throat portion into the interior of the manifold during the normal operation of said engine; and second fuel injection means for feeding fuel into said manifold during acceleration of the engine and comprising a tube portion tightly inserted into said outlet, a first small diameter tube communicating with said tube portion and having an outlet end in the region of said inlet end of said manifold and a second small diameter tube communicating with said tube portion and having an outlet end closely adjacent said butterfly valve, said second small diameter tube extending through the interior of said manifold.

4,052,490
CARBURETOR WITH MANUALLY ADJUSTABLE FUEL SUPPLY

Walter W. Fedison, Ortonville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed May 10, 1976, Ser. No. 684,705
Int. Cl.² F02M 7/08
U.S. Cl. 261—34 A 7 Claims



1. A carburetor having an induction passage adapted to be connected to an engine intake minifold, a fuel bowl containing fuel, a first main conduit connecting the fuel bowl and induction passage for supplying the normal fuel requirements to the passage, a second conduit connected to the fuel bowl and operatively connected at times to the passage for supplying at times additional fuel to the passage, an accelerator pump connected to the fuel bowl, and third conduit means connecting the accelerator pump and passage for supplying further additional fuel to the passage in response to operation of the accelerator pump, and a single manually movable valve means operatively movably associated with both of the second and third conduits for simultaneously controlling flow of additional fuel through the second and third conduits to the passage.

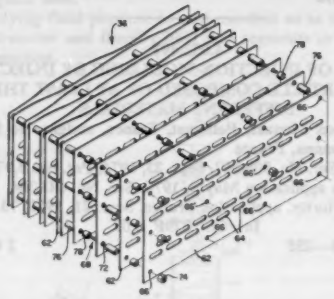
4,052,491
MODULAR GAS AND LIQUID CONTACT MEANS

Marcel Robert Lefevre, Bernardsville, N.J., assignor to Research-Cottrell, Inc., Bound Brook, N.J.

Filed June 25, 1976, Ser. No. 700,029
Int. Cl.² B01F 3/04
U.S. Cl. 261—112 5 Claims

1. In a cooling tower having an air inlet at its lower end, an air outlet at its upper end and an air passage extending between the air inlet and the air outlet, gas and liquid contact means in

the air passage and liquid distribution means positioned in the air passage above the gas and liquid contact means wherein the gas and liquid contact means comprise a plurality of sheet members, a plurality of sets of spacer members at least at the



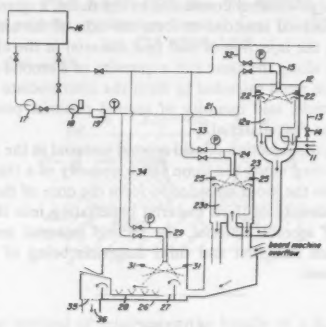
peripheral margins of the sheet members maintaining the sheet members in side-by-side spaced relationship, at least two sets of the plurality of sets of spacer members having different lengths whereby the sheet members are spaced in an undulated array.

4,052,492

METHOD FOR PRODUCING PREFORMED EXPANSION JOINT FILLERS

Merle E. Kontny, Portland, and Dorsey J. Morris, St. Helens, both of Oreg., assignors to Kaiser Gypsum Company, Inc., Oakland, Calif.

Filed June 16, 1975, Ser. No. 586,953
Int. Cl.² B01J *2/06*
U.S. Cl. 264—6 **5 Claims**



1. In a method for producing preformed fiberboard expansion joint fillers wherein

1. asphalt is heated to a liquid state,
2. the liquid asphalt is sprayed through a first atomizing device to form a first atomized asphalt,
3. the first atomized asphalt is passed through a first spray of cooling water whereby said first atomized asphalt is chilled and formed into a first shower of solidified asphalt particles,
4. the shower of asphalt particles is incorporated into a cellulose-fiber-containing slurry in a first container to form an asphalt-and-cellulose-fiber-containing slurry,
5. the asphalt-and-cellulose-fiber-containing slurry is conducted to a wire screen and wet mat formed thereon, and
6. the wet mat dried then slit to form preformed fiberboard expansion joint fillers,

the improvement comprising:

a. using as the said asphalt in step (1), one having a penetration of at least 60 at 130° F, and
b. carrying out said heating of the asphalt, in step (1), to about 350° F.

4,052,493

PROCESS FOR PRODUCING CONDUCTIVE FIBER

Sylvia Etchells, Pontypool, England, assignor to Imperial Chemical Industries Limited, Millbank, England

Filed Nov. 8, 1972, Ser. No. 304,867
Claims priority, application United Kingdom, Oct. 26, 1971, 49643/71
Int. Cl.² C08L *77/00*; B29H *7/20*
U.S. Cl. 264—49 **7 Claims**

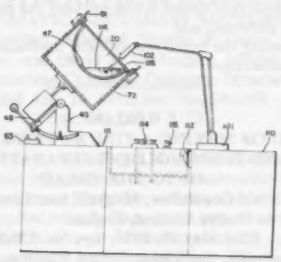
1. A process for producing fibre which comprises melt spinning a fibre-forming polyamide having dispersed therein as a separate phase between 1% and 14% by weight inclusive of a additive which is the reaction product of a boric acid and a polyoxyalkylene material of average molecular weight within the range 600 to 30,000.

4,052,494

TRANSPARENCY FABRICATION METHOD

Peter P. Garrigan, Culver City; Alfred A. Gordon, Torrance, and Walter W. Watson, Rancho Palos Verdes, all of Calif., assignors to Northrop Corporation, Los Angeles, Calif.

Filed Nov. 17, 1975, Ser. No. 632,695
Int. Cl.² B29C *9/00*; D06P *3/00*
U.S. Cl. 264—78 **18 Claims**



1. The process of uniformly dyeing the inside surface of a substantially hemispherically shaped transparent article for end use in a simulator visual display projection system or the like in which light is projected through said article to a screen, comprising:

a. positioning said article concave side up with the extremities thereof level whereby the concavity can be completely filled with a dye solution;
b. rotating said article about a central vertical axis;
c. completely filling said article with said dye solution;
d. mixing said dye solution while said article is rotating; and
e. pouring said dye solution from said article when the desired color density is achieved.

4,052,495

METHOD OF OBTAINING RELEASE OF POLYURETHANE POLYMERS AND COMPOSITIONS THEREFOR

John G. Uhlmann, and Joseph A. Colquhoun, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

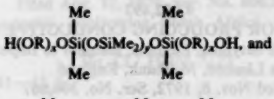
Filed May 19, 1975, Ser. No. 578,561
Int. Cl.² B29D *7/02*; C08L *83/06*
U.S. Cl. 264—216 **12 Claims**

1. A method of releasing non-cellular cured urethane polymers from substrates, which method consists of

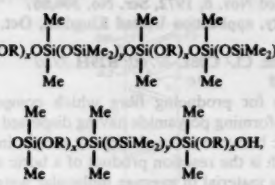
I. introducing into an uncured non-cellular urethane poly-

mer from 0.5 to 5 weight percent based on the weight of the non-cellular urethane polymer and siloxane-polyoxyalkylene copolymer, a siloxane-polyoxyalkylene copolymer selected from the group consisting of

(A)



(B)



wherein each x has an average value of 3 to 45, each y has an average value of 8 to 198, Me is a methyl radical, wherein $—OR_x$ is a polyoxyalkylene polymer or copolymer wherein R is composed of ethylene radicals or butylene radicals and mixtures of ethylene or butylene radicals with propylene radicals, the amount of ethylene or butylene radicals relative to the propylene radicals being such that the ratio of carbon atoms to oxygen atoms in the total —OR— block ranges from 2.0/1 to 2.9/1,

II. curing the non-cellular urethane polymer while in contact with a substrate, whereby the siloxane-polyoxyalkylene copolymer is reacted into the non-cellular urethane polymer, and

III. releasing the cured non-cellular urethane-polymer from said substrate.

4,052,496

METHOD OF MAKING A TIRE BY FIRST MOLDING A TREAD AND THEN MOLDING SEPARATE SIDEWALLS ONTO THE TREAD

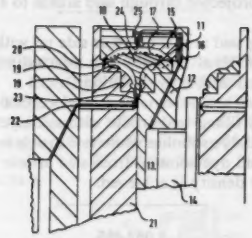
Anthony Gerald Goodfellow, Maghull, near Liverpool, England, assignor to Dunlop Limited, England

Filed May 20, 1975, Ser. No. 579,238

Claims priority, application United Kingdom, May 28, 1974, 23576/74

Int. Cl.² B29H *3/08, 5/02*

U.S. Cl. 264—251 **7 Claims**



1. A method for the manufacture of a pneumatic tire comprising initially moulding the tread portion of the tire from uncured rubber in an annular mould cavity the radially inner surface of the cavity being a surface of a solid mould core of cured rubber and the radially outer surface of the cavity being a surface of a tread ring mould, the mould core having substantially the shape of the interior of the tire to be moulded, and being supported during moulding of the tread portion by rigid side plates which engage sidewall moulding surfaces of the core, removing said side plates after moulding said tread portion, leaving said tread portion in place between said core and said tread ring mould, replacing said side plates by mould halves defining sidewall moulding cavities against the sidewall moulding surfaces of the core, forcing uncured rubber into the sidewall moulding cavities to mould said sidewalls onto the tread portion, and curing said rubber of said tread portion and said sidewalls.

4,052,497

METHOD OF INJECTION-MOULDING BY INJECTION OF AN ARTICLE COMPOSED OF AT LEAST THREE DIFFERENT MATERIALS

Bernard Léon Monnet, Bellignat, France, assignor to Billion S.A., Oyonnax, France

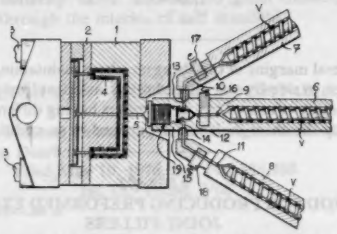
Division of Ser. No. 508,567, Sept. 23, 1974, Pat. No. 3,976,226.

This application May 5, 1976, Ser. No. 683,384

Claims priority, application France, Sept. 21, 1973, 73.34011

Int. Cl.² B29F *1/03*

U.S. Cl. 264—255 **2 Claims**



1. A method for manufacturing by injection molding in a mold of an article having a core, a skin and at least an intermediate layer embedding said core and being covered by said skin, said method comprising the steps of successively

injecting into the mold, along the direction of the axis of a discharge channel connected to the mold, a quantity of a first material intended to form the skin of the article,

stopping the injection of said first material in the channel,

injecting along the same axis a quantity of a second material into the mold intended to form the intermediate layer of the article, said quantity of second material penetrating into the first material,

stopping the injection of said second material in the channel, and injecting along the same axis a quantity of a third material into the mold intended to form the core of the article, said quantity of third material penetrating into the quantity of second material, the second material interposed between said first and third materials being of uniform thickness.

4,052,498

GUIDE APPARATUS FOR DEFLECTING A LINEAR STRUCTURE

Burghard Burow, Radevormwald, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Division of Ser. No. 670,142, March 25, 1976. This application Feb. 7, 1977, Ser. No. 765,998

Claims priority, application Germany, Mar. 29, 1975, 2514072

Int. Cl.² F16L *9/22*

U.S. Cl. 264—261 **2 Claims**

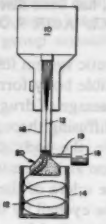
1. A method utilizing an expandable mandrel for producing a filament deflecting curved guide tube within a casing. having an entry and exit opening, the guide tube being formed of a plurality of contiguous abutting segments which are held in a fixed array within said casing by means of a bonding agent, said method comprising:

inserting the segments in a predetermined order about the mandrel,

positioning said mandrel and segments within the casing so that the faces of the first and last segments abut the inner surface of the casing about its entry and exit openings,

twisting said segments about said mandrel to a position wherein they form the desired spatial curvature of the guide tube,

applying fluid pressure to said mandrel so as to expand its diameter and thereby hold said segments in said desired position,



filling the interior of said casing with a bonding agent which hardens about said segments thereby fixing them in said desired position,

relieving the fluid pressure from said mandrel so as to allow it to return to its original diameter prior to expansion, and

withdrawing said mandrel from within said segment bores and casing.

4,052,499

METHOD OF REINFORCING THE HANDLE OF HOCKEY STICKS

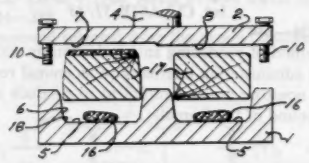
Marcel Goupil, 948 Chasse Street; Gaston Ruel, 265 Lemire Boulevard, and Marc Ruel, 124 Biron Street, all of Drummondville, Quebec, Canada

Filed July 7, 1975, Ser. No. 593,654

Claims priority, application Canada, Aug. 16, 1974, 207171

Int. Cl.² B29D *3/02*

U.S. Cl. 264—265 **4 Claims**



1. The method of reinforcing the handle of a hockey stick comprising the steps of laying a roving of reinforcing fibers impregnated with uncured thermosetting synthetic resin longitudinally in the flat bottom of an elongated open top female solid having straight side walls flaring upwardly from said bottom and having corner faces at the junction of said bottom and side walls which are inclined relative to said bottom and side walls, using the handle of a hockey stick as a male molding part, said handle made of a compressible material selected from the group consisting of wood and foam plastic and having a substantially rectangular cross-section defining a pair of wider main faces and a pair of narrower and faces, positioning said handle longitudinally in said mold and with one main face of said handle substantially parallel to said bottom and with the longitudinal edges of said main face abutting the respective side walls of said mold and retaining said main face spaced from said bottom, thereby defining a molding space between said female mold and said handle, pressing said handle towards said bottom and against said roving to cause said side walls to engage said narrower end faces of said handle and compress said handle and seal said molding space along said side walls, and to cause said roving to flatten and to fill said molding space and to adhere to said handle main face, heat curing said resin, removing said handle from said female mold with the cured resin forming a flat layer covering and adhering to said face and having bevelled longitudinal edges, and said layer having said fibers embedded therein and longitudinally extending along said handle.

4,052,500

DRAWING ISOCYANATE-TREATED POLYESTER FILAMENTS

Robert P. Kreahling, Fairfield; Donald J. Casey, Ridgefield, both of Conn., and David Z. Goldenberg, Mentor, Ohio, assignors to American Cyanamid Company, Stamford, Conn.

Filed Aug. 16, 1972, Ser. No. 281,247

Int. Cl.² D01D *5/12*

U.S. Cl. 264—290 T **4 Claims**

1. In the process of dry heat drawing filaments of synthetic linear condensation polyester coated with an aromatic isocyanate containing at least two isocyanate groups per molecule to stretch such filaments to 4 to 7 times their undrawn length, the improvement comprising applying to the isocyanate-coated polyester filaments 0.02 to 0.4% on weight of fiber of a hydroxy-containing finish less than one hour prior to dry heat drawing said filaments by heating the filaments in air in contact with a heated surface

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4,052,501

TREATMENT OF POLYESTER FILAMENTS WITH AROMATIC ISOCYANATE MIXTURE

Robert P. Kreahling, Fairfield; Donald J. Casey, Ridgefield, both of Conn., and David Z. Goldenberg, Mentor, Ohio, assignors to American Cyanamid Company, Stamford, Conn.

Filed Aug. 16, 1972, Ser. No. 281,248

Int. Cl.² D01D *5/12*

U.S. Cl. 264—290 T **6 Claims**

1. In the process, including a dry heat drawing step, of making filaments of synthetic linear condensation polyester useful as reinforcement for rubber articles wherein an organic isocyanate is applied to such filaments to improve the adhesion thereof to rubber, the improvement comprising applying, as the organic isocyanate, a mixture of 50 to 90% di-functional aromatic isocyanates, and the remainder higher than di-functional aromatic isocyanates, and then drawing said polyester filaments to 4 to 7 times their undrawn length after applying said mixture of aromatic isocyanates, said drawing step being dry heat drawing, performed by heating the filament in air in contact with a heated surface.

4,052,502

METHOD FOR MANUFACTURING BIDIRECTIONAL HYDRODYNAMIC POLYTETRAFLUOROETHYLENE SEALS

William Eugene Clark, Chelsea, Mich., assignor to Federal-Mogul Corporation, Southfield, Mich.

Division of Ser. No. 541,926, Jan. 17, 1975, Pat. No. 3,984,113. This application Feb. 18, 1976, Ser. No. 659,006

Int. Cl.² B29D *15/00*

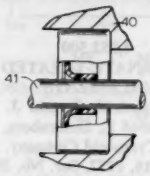
U.S. Cl. 264—293 **2 Claims**

1. A method for making a bidirectional hydrodynamic polytetrafluoroethylene sealing element, including in combination:

providing a flat annular wafer of polytetrafluoroethylene of constant thickness and having an outer periphery and an inner periphery,

coining in an annular inner portion of said wafer adjacent said inner periphery to compress said inner portion and make it thinner than the remainder of said wafer, while providing controlled areas that are coined to a lesser degree, thereby to provide a circular rib adjacent to said inner periphery projecting out from said inner portion and having an inner side on the side nearer said inner periph-

ery, and a series of straight segmental ribs spaced apart from each other and extending out from said inner portion along linear paths tangential to the inner side of said circular rib, thereby intersecting said inner rib, said segmental ribs projecting out further from the surface of said inner portion than said circular rib, and



forming said annular inner portion into a generally frustoconical shape, whereby said straight ribs appear as curved ribs, said frustoconical portion being flexed on installation on a shaft into a generally cylindrical portion where said ribs lie.

4,052,503

LOW-TEMPERATURE SYNTHESIS OF UREA

Richard L. Every, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 581,189, Sept. 22, 1966, abandoned. This application Apr. 23, 1970, Ser. No. 31,420

Int. Cl.[2] C01C *1/16*; C07C *126/00*

U.S. Cl. 423—470 **8 Claims**

1. A process for producing urea and ammonium chloride in high yield with a low level of impurities comprising combining as reactants phosgene and ammonia at a temperature in the range of about −70° C. to about −20° C. by adding one reactant to the other and maintaining the combination in said temperature range.

4,052,504

ASSAY FOR THYROXINE BINDING GLOBULIN

William Hertl, Corning, and Gerald Odstrchel, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed June 30, 1976, Ser. No. 701,191

Int. Cl.[2] G01N *33/00*, *33/16*

U.S. Cl. 424—1 **6 Claims**

1. A method of determining the concentration of thyroxine binding globulin in a sample, the method comprising the steps of

1. adding to the sample an excess amount of thyroxine;
2. analyzing the sample for thyroxine via separate immunoassays, one immunoassay being in the presence of a blocking agent and the other immunoassay being in the absence of a blocking agent to thereby establish a binding differential; and
3. then correlating that differential with a standard curve which relates known thyroxine binding globulin concentrations with binding differentials.

4,052,505

OCULAR THERAPEUTIC SYSTEM MANUFACTURED FROM COPOLYMER

Takeru Higuchi, Lawrence, Kans., and Anwar Hussain, Lexington, Ky., assignors to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 582,353, May 5, 1975, which is a division of Ser. No. 281,446, Aug. 17, 1972, Pat. No. 3,903,880, which is a continuation-in-part of Ser. No. 80,531, Oct. 14, 1970, abandoned. This application July 15, 1976, Ser. No. 705,479

The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.

Int. Cl.[2] A61K *9/00*, *9/22*

U.S. Cl. 424—14 **19 Claims**

1. An ocular therapeutic system for the controlled release of drug comprising a flexible body formed of a polymeric material permeable to the passage of drug by diffusion and containing a drug capable of diffusing through the material at a therapeutically effective rate, the body shaped, sized and adapted for comfortable insertion and retention in the cul-de-sac of the conjuctiva between the sclera of the eyeball and the lid to be held in place against the eyeball by the pressure of the lid, and wherein said polymeric material comprises an ethylene-vinyl acetate copolymer having a vinyl acetate content of about 4 to 80% by weight, and a melt index of about 0.1 to 1000 grams per ten minutes.

4,052,506

PHARMACEUTICAL COMPOSITIONS AND METHOD OF PRODUCING ANTI-PARKINSONISM ACTIVITY

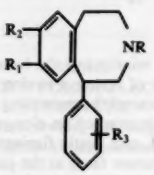
Carl Kaiser, Haddon Heights, N.J.; Robert G. Pendleton, Philadelphia, and Paulette E. Setler, Fort Washington, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Aug. 5, 1975, Ser. No. 602,042

Int. Cl.[2] A61K *31/33*

U.S. Cl. 424—244 **10 Claims**

1. A method of producing anti-parkinsonism activity which comprises administering internally to an animal requiring said activity a nontoxic amount sufficient to produce said activity of a compound of the formula:



in which:

R is hydrogen, lower alkyl of from 1 to 4 carbon atoms, hydroxyethyl or lower alkenyl of from 3 to 5 carbon atoms;

R_1 is hydroxy, methoxy, ethoxy or alkanoyloxy;

R_2 is hydrogen, hydroxy, methoxy, ethoxy or alkanoyloxy;

R_3 is hydrogen, chloro, bromo, fluoro, methyl or trifluoromethyl; and

said alkanoyl moieties have from 2 to 5 carbon atoms,

provided that when R_1 and R_2 are both methoxy or ethoxy, R is hydrogen, or a pharmaceutically acceptable acid addition salt of said compound.

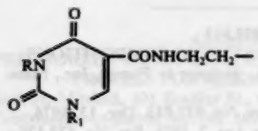
4,052,507

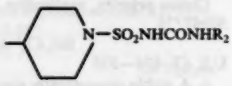
PIPERIDINESULFONYLUREA DERIVATIVES

Hans E. Wiedermann, Niantic, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 629,771, Nov. 7, 1975, Pat. No. 3,998,828, which is a division of Ser. No. 546,003, Jan. 31, 1975, Pat. No. 3,936,445. This application Sept. 24, 1976, Ser. No. 726,126
Int. Cl.² A61K *31/505*
U.S. Cl. 424—251 12 Claims

1. A method for lowering blood sugar in the treatment of a diabetic animal, which comprises orally administering to said animal an effective blood sugar lowering amount of a compound selected from a group consisting of 1-piperidinesulfonylureas of the formula:





and the base salts thereof with pharmacologically acceptable cations, wherein R and R_1 are each alkyl having from one to three carbon atoms, and R_2 is a member selected from the group consisting of bicyclo[2.2.1]hept-5-en-2-yl-endo-methyl, bicyclo[2.2.1]hept-2-yl-endo-methyl, 7-oxabicyclo[2.2.1]hept-2-yl-endo-methyl, 1-adamantyl and cycloalkyl having from five to eight carbon atoms.

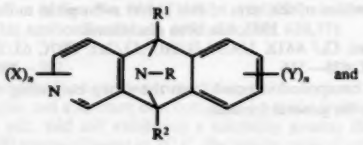
4,052,508

HETEROCYCLIC DIHYDROANTHRACEN IMINES

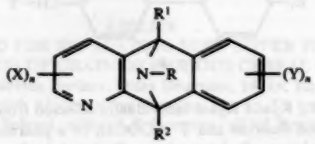
Paul S. Anderson, Lansdale; Marcia E. Christy, Perkasie, and Gerald S. Ponticello, Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 498,484, Aug. 19, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 564,012
Int. Cl.² C07D *471/08*; A61K *31/395*; C07D *487/08*
U.S. Cl. 424—258 7 Claims

1. A compound selected from the group consisting of:



and



wherein

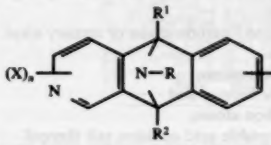
R^1 and R^2 are selected from the group consisting of hydrogen, lower alkyl having from 1 to 6 carbon atoms, trifluoromethylsulfonyl, trifluoromethyl, dimethylaminopropyl;

R is hydrogen or lower alkyl having from 1 to 6 carbon atoms, benzyl, dimethylaminopropyl, cyclopropyl, or cyclobutyl;

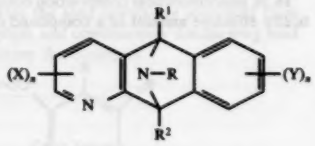
X and Y are iodo, chloro, bromo, lower alkoxy having from 1 to 6 carbon atoms, lower alkyl having from 1 to 6 carbon atoms, thiomethyl, carboxamido, trifluoromethoxy, trifluoromethyl, trifluoromethylsulfonyl, and trifluoromethylthio;

n is an integer selected from 0 (X or Y is hydrogen), and 1.

3. A pharmaceutical composition for use as tranquilizer, muscle relaxant, anti-convulsant and/or anti-Parkinson agent in unit dosage form comprising a pharamaceutical carrier and an effective amount of a compound of formula:



or



wherein

R^1 and R^2 are selected from the group consisting of hydrogen, lower alkyl having from 1 to 6 carbon atoms, trifluoromethylsulfonyl, trifluoromethyl, dimethylaminopropyl;

R is hydrogen or lower alkyl having from 1 to 6 carbon atoms, benzyl, dimethylaminopropyl, cyclopropyl, or cyclobutyl;

X and Y are iodo, chloro, bromo, lower alkoxy having from 1 to 6 carbon atoms, lower alkyl having from 1 to 6 carbon atoms, thiomethyl, carboxamido, trifluoromethoxy, trifluoromethyl, trifluoromethylsulfonyl, and trifluoromethylthio;

n is an integer selected from 0 (X or Y is hydrogen), and 1.

4,052,509

METHOD FOR REDUCING SERUM URIC ACID LEVELS

Shreekrishna M. Gadekar, Trenton, N.J., assignor to Affiliated Medical Research, Inc., Princeton, N.J.

Division of Ser. No. 530,684, Dec. 9, 1974, Pat. No. 3,974,281, which is a continuation-in-part of Ser. No. 380,655, July 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 315,836, Dec. 18, 1972, Pat. No. 3,839,346. This application May 14, 1976, Ser. No. 686,650
Int. Cl.² A61K *31/44*
U.S. Cl. 424—263 6 Claims

1. A method for reducing the uric acid level in the serum of a mammal in need of such reduction which comprises administering to said mammal a therapeutically effective amount of 5-methyl-1-phenyl-2-(1H)-pyridone.

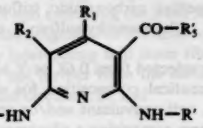
4,052,510

4-ALKYL-2,6-DI(SECONDARY OR TERTIARY ALKYLAMINO) PYRIDINES, COMPOSITIONS THEREOF AND METHODS FOR TREATING DIABETES AND OBESITY

William R. Simpson, Mendham, and Robert J. Strohschein, Parsippany, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

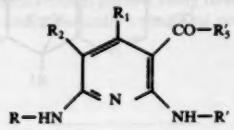
Continuation-in-part of Ser. No. 533,941, Dec. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 460,286, April 12, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 673,409
Int. Cl.² C07D *213/50*; A61K *31/44*, *31/455*
U.S. Cl. 424—263 30 Claims

1. A compound having the formula



wherein
R is secondary alkyl of 3 to 7 carbon atoms or tertiary alkyl of 4 to 7 carbon atoms,
R' is secondary alkyl of 3 to 7 carbon atoms or tertiary alkyl of 4 to 7 carbon atoms,
R_1 is alkyl of 1 to 4 carbon atoms,
R_2 is hydrogen, chloro or bromo, and
R_3' is alkyl of 1 to 4 carbon atoms,
or a pharmaceutically acceptable acid addition salt thereof.

16. A pharmaceutical composition comprising a pharmaceutically effective amount of a compound of the formula



wherein
R is secondary alkyl of 3 to 7 carbon atoms or tertiary alkyl of 4 to 7 carbon atoms,
R' is secondary alkyl of 3 to 7 carbon atoms or tertiary alkyl of 4 to 7 carbon atoms,
R_1 is alkyl of 1 to 4 carbon atoms,
R_2 is hydrogen, chloro or bromo, and
R_3' is alkyl of 1 to 4 carbon atoms,
or a pharmaceutically acceptable acid addition salt thereof, and a pharmaceutically acceptable carrier, said pharmaceutically effective amount being an amount effective for the treatment of obesity or diabetes.

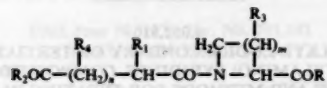
4,052,511

CARBOXYACYLPROLINE DERIVATIVES

David W. Cushman, West Windsor, and Miguel Angel Ondetti, Princeton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 13, 1976, Ser. No. 657,793
Int. Cl.² A61K *31/40*; C07D *207/10, 207/12*
U.S. Cl. 424—274 **28 Claims**

1. A compound of the formula



wherein
R is hydroxy, amino or lower alkoxy;
R_1 and R_4 each is hydrogen, lower alkyl or phenyl-lower alkyl;
R_2 is hydroxy, amino, hydroxyamino, or lower alkoxy;
R_3 is hydrogen, hydroxy or lower alkyl;
m is 2;
n is 0, 1 or 2
and basic salts thereof, said lower alkyl and lower alkoxy groups having up to 7 carbons.

4,052,512

PROSTAGLANDIN ANALOGUES

Masaki Hayashi; Seiji Kori, and Hirohisa Wakatsuka, all of Takatsuki, Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

Filed Jan. 5, 1976, Ser. No. 646,316
The portion of the term of this patent subsequent to Jan. 6, 1993, has been disclaimed.
Int. Cl.² C07C *177/00*; A61K *31/19, 31/215*
U.S. Cl. 424—305 **3 Claims**

1. 16,16-dimethyl-trans-Δ^2-PGE_1 or the C_1–C_{10} alkyl esters, cyclodextrin clathrate, or non-toxic salt thereof.

4,052,513

STABLE TOPICAL ANESTHETIC COMPOSITIONS

Carl Kaplan, Memphis, Tenn., assignor to Plough, Inc., Memphis, Tenn.

Continuation-in-part of Ser. No. 532,533, Dec. 13, 1974, abandoned. This application Apr. 2, 1976, Ser. No. 673,175
Claims priority, application United Kingdom, Dec. 11, 1975, 50867/75
Int. Cl.² A61K *31/245*
U.S. Cl. 424—310 **10 Claims**

1. A stable cosmetically elegant oil in water emulsion useful as a topical anesthetic comprising 0.5 to 15 percent of benzocaine; 5 to 40 percent of a cosmetically acceptable dialkyl ester of an alkanedioic acid which is a liquid at 10° C and having the formula ROOC—C_nH_{2n}—COOR', where R and R' are alkyl groups of from 1 to 4 carbon atoms and *n* is an integer from 1 to 8; at least one cosmetically acceptable surfactant, and water.

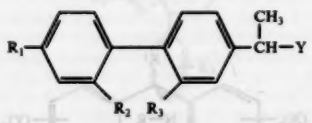
4,052,514

TRIHALOSUBSTITUTED BIPHENYLYL PROPIONIC ACIDS

Stewart S. Adams, Redhill; Bernard J. Armitage, and John S. Nicholson, both of Beeston, all of England, assignors to The Boots Company Limited, England

Continuation-in-part of Ser. No. 235,825, March 17, 1972, abandoned. This application Sept. 14, 1973, Ser. No. 397,604
Claims priority, application United Kingdom, Sept. 22, 1972, 44013/72; Mar. 26, 1971, 7936/71
The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.
Int. Cl.² A61K *31/19, 31/205, 31/215*; C07C *63/33*
U.S. Cl. 424—316 **20 Claims**

1. A compound selected from the group consisting of acids having the general formula:



in which R_1, R_2 and R_3 are individually selected from chlorine, bromine and fluorine and Y is COOH, or a pharmaceutically acceptable lower-alkyl ester, in an alkali metal salt, or an amine salt thereof.

11. A therapeutic composition suitable for use in the treatment of inflammation comprising an effective anti-inflammatory amount of a compound according to claim 1 in association with a pharmaceutical excipient.

17. A method of treating inflammation in a patient comprising administering an effective amount of a compound according to claim 1.

4,052,515

METHOD OF TREATING ACNE WITH ALCOHOL

James A. McDermott; Robert L. Anderson, and Maurice E. Loomans, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 18, 1976, Ser. No. 658,956
Int. Cl.² A61K *31/045*
U.S. Cl. 424—343 **9 Claims**

1. A method of treating acne comprising applying to the skin areas so affected from 3 milligrams per square centimeter to 10 milligrams per square centimeter of a composition containing from 1 to 10% of a saturated or unsaturated higher alcohol having from 6 to 12 carbon atoms and the balance a lower alcohol selected from the group consisting of ethanol, propanol, ispropanol and mixtures thereof.

4,052,516

PRECOOKED PEANUT-CONTAINING MATERIALS AND PROCESS FOR MAKING THE SAME

Jack H. Mitchell, 101 Bradley St., Clemson, S.C. 29631

Continuation-in-part of Ser. No. 187,837, Oct. 8, 1971, Pat. No. 3,800,056, which is a continuation-in-part of Ser. No. 839,673, July 7, 1969, Pat. No. 3,689,287. This application Mar. 22, 1974, Ser. No. 453,615
Int. Cl.² A23L *1/36*
U.S. Cl. 426—271 **14 Claims**

1. A process for making precooked dehydrated peanut food ingredients which comprises coarsely grinding shelled peanuts without releasing oil, and without reducing the moisture content of the peanuts, adding a sufficient amount of water to the coarsely ground peanuts to form a slurry and prevent congealment to a semisolid when the slurry is disintegrated, disintegrating the slurry in such a manner that the cellular tissue is torn into shreads thereby releasing oil, water soluble protein and carbohydrates to form an emulsion of oil with the water, and a suspension of solids, heating the emulsion-suspension at a temperature of about 200° F for 30 minutes up to about 325° F for about 5 seconds to increase the consistency as the protein coagulates and starch is gelatinized, and to stabilize the oil against oxidation, and drying the resultant material thereby providing a slightly coarse texture in the dehydrated food ingredient.

4,052,517

SHAPED TEXTURED PROTEIN FOOD PRODUCT

Rudolph William Youngquist, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 506,079, Sept. 16, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,771
Int. Cl.² A23J *1/14*
U.S. Cl. 426—302 **20 Claims**

17. A protein food product comprising edible textured protein particles and a mixture of a cottonseed protein isolate and an edible salt, said salt exhibiting a solubility greater than 1 gram in 100 grams of water at 25° C, the weight ratio of cottonseed protein isolate to salt being from about 1:1 to 30:1.

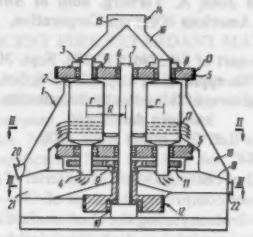
4,052,518

METHOD FOR SEPARATING SEED COVER FROM ENDOSPERM OF GRAIN OF VARIOUS CEREAL CROPS

Vasily Nikolaevich Borisov, ulitsa Baumana, 14, kv. 12; Evgeny Alexandrovich Akulov, ulitsa Totmina, 13a, kv. 53, and Alexei Ivanovich Solovei, ulitsa 4 Prigornaya, all of Krasnoyarsk, U.S.S.R.

Division of Ser. No. 518,143, Oct. 25, 1974, Pat. No. 3,945,312. This application Jan. 6, 1976, Ser. No. 646,882
Claims priority, application U.S.S.R., Dec. 19, 1973, 1974602
Int. Cl.² A23P *1/00*; A23N *7/00*
U.S. Cl. 426—482 **2 Claims**

1. A method for separating seed cover from endosperm of grain of various cereal crops comprising the steps of: continuously charging grain into a container; continuously imparting to the container a rotary motion about its own axis and imparting concurrently an additional rotary motion about an axis of rotation extending in parallel with and in the same plane as the axis of the container, the acceleration of the grain in the container being applied within the range from 100 g to 1000g for a period of time such that the seed covers are separated from the endosperm of the grain, and continuously discharging seed cover and endosperm from the container.

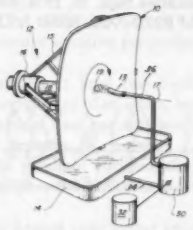


4,052,519

NON-SETTLING PROCESS FOR COATING A PHOSPHOR SLURRY ON THE INNER SURFACE OF A CATHODE RAY TUBE FACEPLATE

Charles J. Prazak, III, Elmhurst, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed July 2, 1975, Ser. No. 592,431
Int. Cl.² B05D *5/06, 3/12*
U.S. Cl. 427—68 **20 Claims**



1. A non-settling process for forming on an inner viewing surface of a color cathode ray tube faceplate a coating of an aqueous slurry composed of a photosensitized organic binder and a suspension of phosphor particles, which coating exhibits a high degree of coating weight uniformity, a relatively high phosphor coating weight, and suppressed radial streaking, said process comprising:

supporting the faceplate such that the central axis of the faceplate has a substantial horizontal component;

slowly rotating the faceplate about the central axis thereof while dispensing a stream of phosphor slurry onto the central region of the faceplate inner surface such that, due to gravitational forces and the slow rotation of the faceplate through the descending slurry stream, the slurry is suffused to the perimeter of the faceplate inner surface without any significant settling out of phosphor particles onto the faceplate; and

levigating the coating by rotating the coated faceplate at a moderate angular velocity for a brief time interval, the joint effect of which moderate velocity and interval being to level and thin down the coating to a predetermined thickness while suppressing the formation of radial streaks in the coating radially outwardly of irregularities in or on the faceplate inner surface.

4,052,520

PROCESS FOR COATING A SYNTHETIC POLYMER SHEET MATERIAL WITH A DURABLE ABRASION-RESISTANT VITREOUS COMPOSITION

Leei Chang, and John A. Verburg, both of Swanzey, N.H., assignors to American Optical Corporation, Southbridge, Mass.

Continuation-in-part of Ser. No. 510,270, Sept. 30, 1974, Pat. No. 3,991,234. This application Aug. 12, 1976, Ser. No. 713,934
The portion of the term of this patent subsequent to Nov. 9, 1993, has been disclaimed.
Int. Cl.[2] B05D *3/10, 5/00*
U.S. Cl. 427—164 9 Claims

1. The method of coating a sheet of material of diallyl glycol carbonate polymer comprising the steps of:

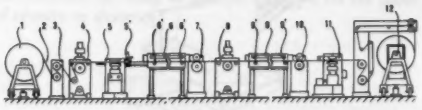
1. first step — hydroxylating the sheet surface to be coated;
2. second step — applying to the hydroxylated surface of the sheet by vacuum deposition a base coating of a material selected from the group consisting of silicon monoxide and a mixture of silicon dioxide and silicon monoxide, by evaporation of silicon monoxide in an oxygen atmosphere under a vacuum lower than 1×10^{-4} torr, said base coating being at least one molecule in thickness; and
3. third step — applying to the coated surface of the sheet of the second step by vacuum deposition an outer coating of evaporable glass, said evaporable glass being in a thickness of about one micrometer or higher, said glass coating being applied at a pressure lower than 5×10^{-4} torr.

4,052,521

COATING AND CALENDARING OF 2-DIMENSIONALLY TENSIONED FABRIC

Serge Ferrari, 69390 Charly, Vernaison, Rhone, France

Continuation-in-part of Ser. No. 506,815, Sept. 19, 1974, abandoned. This application Sept. 20, 1976, Ser. No. 724,667
Int. Cl.[2] B29D *7/22;* B05D *3/12*
U.S. Cl. 427—173 2 Claims



1. The method of coating a flexible fabric having nubs on its surface with a coating of synthetic heat curable plastic material to produce on one side of the fabric a smooth and uniform coating thereover covering the nubs, comprising the steps of:

drawing the fabric through a treating path while longitudinally tensioning the fabric;

gripping the fabric along its edges while passing through said path and tensioning the fabric transversely of said path;

applying a first coating of heat curable plastic material to said one side of said fabric;

heat curing within said path said first coating on said fabric and calendering said one side of the fabric and first coating to cause the nubs within the cured coating to be essentially uniform in height, while maintaining said longitudinal and transverse tensioning;

applying a second coating of heat curable plastic material within said path to the same side of the fabric sufficient to fill the surface of the first coating to include said height of the calendered nubs while the fabric and first coating are still heated, and calendering said fabric and second coating while maintaining said longitudinal and transverse tensioning;

heat curing within said path said second coating on said fabric while maintaining said longitudinal and transverse tensioning; and

then releasing said tensioning and rolling up the coated fabric.

4,052,522

BICYCLE MUDGUARD

Koji Narita, Nagoya, Japan, assignor to Inoue Gomu Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jan. 23, 1973, Ser. No. 326,098
Claims priority, application Japan, Aug. 2, 1972, 47-091324[U]
Int. Cl.[2] B60R *19/00;* B32B *15/04;* B62B *9/16*
U.S. Cl. 428—31 4 Claims

1. A bicycle mudguard comprising:

a substrate layer of an acrylonitrile-butadiene-styrene resin having the strength and rigidity required of such mudguards;

a surface layer of at least one transparent, weather resistant resin selected from the group consisting of cellulose acetate-butyrate and vinyl chloride resins; and

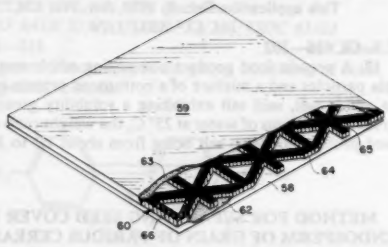
an intermediate layer having a thickness of 20 to 100 between said surface layer and said substrate layer, said intermediate layer being made of a synthetic resin material covered with a thin substantially continuous coating of fully reflective metallic material which reflects light rays passing through said transparent surface layer.

4,052,523

COMPOSITE SANDWICH LATTICE STRUCTURE

Marvin D. Rhodes, Yorktown, and Martin M. Mikulas, Jr., Williamsburg, both of Va., assignors to The United States of America as represented by the National Aeronautics and Space Administration, Washington, D.C.

Filed Sept. 14, 1976, Ser. No. 723,264
Int. Cl.[2] B32B *3/12*
U.S. Cl. 428—116 17 Claims



1. A lightweight sandwich panel comprising:

an internal skin;

an external skin spaced from said internal skin;

an intermediate core disposed between said internal skin and said external skin and attached thereto;

said intermediate core being formed of multiple honeycomb cells with the openings thereof being disposed toward and closed by said internal skin and said external skin,

said intermediate core further having said honeycomb cells disposed in a plurality of rows with said rows forming a lattice structural configuration to provide a plurality of

triangular openings between adjacent rows of honeycomb cells,

said internal and said external skins being formed of individual tape strips of material; and wherein said individual tapes of material secured to said rows of honeycomb cells are constructed of a graphite-epoxy composite.

4,052,524

METHOD FOR IMPROVING ADHESIVE BONDING IN STEEL/RUBBER COMPOSITES AND ARTICLE

Nicholas K. Harakas; Kent H. Fulton; Paul A. Tierney, all of Raleigh, and Malcolm F. Bender, Durham, all of N.C., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 15, 1975, Ser. No. 605,086

Int. Cl.[2] B32B *15/02, 15/08*

U.S. Cl. 428—383 **9 Claims**

1. A method for improving the hydrolytic stability of the adhesive bond between an RFL organic adhesive and a steel reinforcing element for rubber articles, said method comprising the following steps in sequence:

a. immersing a steel or alloy steel reinforcing element in an aqueous bath which contains an inorganic acid having a pH in the range of from about 1 to 2.5 at make-up or a strong base having a pH in the range of from about 9 to 10.5 at make-up for a period of from 3 to 25 seconds with the bath being maintained at a temperature in the range of from 20° C. to 95° C.;

b. subjecting said element to a water rinse;

c. coating the surface of the steel element with an organosilane compound of the formula

$$X - R^1 - Si - (OR^2)_3$$

where X is an amino, glycidoxy or an aminoethyl radical; and wherein R^1 is an alkylene radical of from 2 to 4 carbon atoms when X is amino or glycidoxy and —HN—R^3—, where R^3 is an alkylene radical of from 2 to 3 carbon atoms when X is aminoethyl; and wherein R^2 is an alkyl of from 1 to 2 carbon atoms;

d. dipping said element in an RFL organic adhesive; and

e. curing said dipped element.

4,052,525

MULTI-LAYER STRUCTURE ACRYLIC POLYMER COMPOSITION

Fumio Ide; Kazuo Kishida, and Akira Hasegawa, all of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Apr. 23, 1976, Ser. No. 679,712

Claims priority, application Japan, May 6, 1975, 50-54364

Int. Cl.[2] B32B *27/36, 27/08*

U.S. Cl. 428—412 **15 Claims**

1. A multi-layer structure polymer composition, comprising: an innermost layer (A), an elastomeric polymer layer (B), and outermost layer (C), and at least one intermediate layer, said layer (A) has a glass transition temperature (T_g) of at least 10° C and consisting of 51 to 100 parts by weight of an alkyl methacrylate whose alkyl group has 4 or less carbon atoms, 0 to 49 parts by weight of a monomer having a copolymerizable double bond, 0 to 10 parts by weight of a polyfunctional monomer, and 0.1 to 5 parts by weight of a graftlinking agent; said layer (B) having a (T_g) of up to and including 0° C and consisting of 80 to 100 parts by weight of an alkyl acrylate whose alkyl group has 8 or less carbon atoms, 0 to 20 parts by weight of a monomer having a copolymerizable double bond, 0 to 10 parts by weight of a polyfunctional monomer, and 0.1 to 5 parts by weight of a graftlinking, agent; said layer (C) having a (T_g) of at least 50° C and consisting of the polymerizate of 51 to 100 parts by weight of an alkyl methacrylate whose alkyl group has 4 or less carbon atoms, and 0 to 49 parts by weight of a monomer having a copolymerizable double bond; and said intermediate layer consisting of 10 to 90 parts by weight of an alkyl methacrylate whose alkyl group has 4 or less carbon atoms, 90 to 10 parts by weight of an alkyl acrylate whose alkyl group has 8 or less carbon atoms, 0 to 10 parts by weight of a polyfunctional monomer, and 0.1 to 5 parts by weight of a graft-linking agent.

4,052,526

INTUMESCENT FIRE RETARDANT MATERIAL AND ARTICLE

Richard D. Pratt, Cincinnati; Paul F. Proffitt, Reading, and George Webb, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 550,933, Feb. 19, 1975, Pat. No. 3,983,082. This application May 17, 1976, Ser. No. 687,102

Int. Cl.[2] B32B *9/04*

U.S. Cl. 428—447 **3 Claims**

1. A metallic article of manufacture including a metallic surface having bonded thereto an improved silicone-base intumescent fire retardant material comprising a mixture of:

35–75 parts by weight of a silicone resin; and

22–112 parts by weight of a mixture of ingredients comprising, by weight:

1–10 parts of an oxide of iron;

17–52 parts of a phosphate of potassium;

2–30 parts of a charring material; and

2–20 parts of a blowing agent.

4,052,527

RADIATION POLYMERIZED HOT MELT PRESSURE SENSITIVE ADHESIVES

Stephen D. Pastor, Edison, and Martin M. Skoultchi, Somerset, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Feb. 7, 1977, Ser. No. 766,026

Int. Cl.[2] C08F *2/46*

U.S. Cl. 428—463 **8 Claims**

1. A method for the production of hot melt adhesive products having pressure sensitive properties comprising the steps of

a. copolymerizing at least one 3-(chlorinated aryloxy)-2-hydroxypropyl ester of an alpha, beta unsaturated carboxylic acid with at least one acrylate based copolymerizable monomer,

b. heating the resultant ethylenically unsaturated prepolymer to a temperature sufficient to render it fluid and flowable,

c. coating the heated prepolymer onto a substrate, and

d. exposing the coated substrate to ultraviolet radiation of wavelength 1800 to 4000 A for a period of time sufficient to crosslink the prepolymer.

4,052,528

TETRAPOLYMER SUBBED PHOTOGRAPHIC FILM

Robert Stanley Cook, and Peter John Wright, both of Ilford, England, assignors to Ciba-Geigy AG, Basel, Switzerland

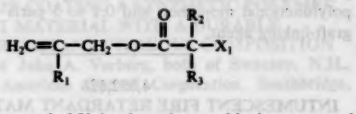
Filed June 23, 1975, Ser. No. 589,224

Claims priority, application United Kingdom, July 4, 1974, 29665/74

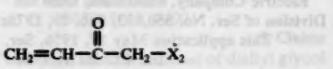
Int. Cl.[2] B32B *27/08, 27/28, 27/36;* **G03C** *1/80*

U.S. Cl. 428—483 **4 Claims**

1. Film material comprising a film of biaxially oriented synthetic linear polyester of highly hydrophobic character having superimposed thereon adherent to said film a layer which comprises a copolymer consisting of (a) 20 to 90 mole % of vinylidene chloride, (b) 5 to 50 mole % of a copolymerisable ethylenically unsaturated monomer selected from the group consisting of alkyl acrylate, alkyl methacrylate, vinyl acetate and acrylonitrile, (c) 1 to 20 mole % of at least one copolymerisable acid selected from the group consisting of acrylic acid, methacrylic acid, itaconic acid, maleic acid, fumaric acid, crotonic acid, mesaconic acid and citraconic acid and (d) 1 to 30 mole % of (d_1) an allyl component of the formula



R_1 is hydrogen or methyl X_1 is a bromine or chlorine atom and R_2 and R_3 are each hydrogen or methyl or are the same halogen atom as X_1, or (d_2) a vinyl component of the formula



wherein X_2 is a chlorine or bromine atom.

4,052,529

RADIATION-CURABLE MERCAPTOALKYL VINYL POLYDIORGANOSILOXANES, METHOD OF COATING THERE WITH AND COATED ARTICLE

Gary N. Bokerman; Joseph A. Colquhoun, both of Midland, and David J. Gordon, Essexville, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 3, 1976, Ser. No. 663,324
Int. Cl.² B05D *3/06*
U.S. Cl. 428—537 **23 Claims**

1. A radiation-curable polydiorganosiloxane composition consisting essentially of a mixture of

A. a trioranganosiloxane-endblocked polydiorganosiloxane fluid having a viscosity of at least 0.5 pascal-seconds at 25° C., wherein from 50 to 99 percent of all organic radicals are methyl, from 1 to 5 percent of all organic radicals are mercaptoalkyl having the formula $—(CH_2)_nSH$, wherein n has a value of from 1 to 4 inclusive, any remaining organic radicals in (A) being alkyl radicals having from 2 to 6, inclusive, carbon atoms or phenyl, and

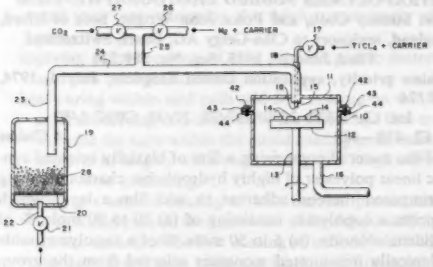
B. a methylvinylpolysiloxane, compatible with (A) and having an average of at least three vinyl groups per molecule, the amount of (B) being sufficient to provide from 0.2 to 1.0 silicon-bonded vinyl radicals for every silicon-bonded mercaptoalkyl radical in the composition.

4,052,530

CO-DEPOSITED COATING OF ALUMINUM OXIDE AND TITANIUM OXIDE AND METHOD OF MAKING SAME

Frank Fonzi, Cedar Hill, Tex., assignor to Materials Technology Corporation, Dallas, Tex.

Filed Aug. 9, 1976, Ser. No. 712,481
Int. Cl.² B32B *9/04, 15/04*
U.S. Cl. 428—552 **6 Claims**



1. An article of manufacture comprising:

a. a substrate having a wear surface, and

b. a dense continuous composite coating of aluminum oxide and titanium oxide adherently bonded to and covering at least a portion of said wear surface.

4,052,531

INDIUM-CONTAINING SILVER-COPPER-ZINC BRAZING ALLOY

Hans T. Steine, Crissier; Wolfgang Simm, Lausanne, both of Switzerland, and Joseph F. Quaas, Island Park, N.Y., assignors to Eutectic Corporation, Flushing, N.Y.

Filed Aug. 14, 1975, Ser. No. 604,831
Int. Cl.² B32B *15/20;* B23K *3/00;* C22C *5/08*
U.S. Cl. 428—673 **3 Claims**

1. A brazed joint comprising at least a pair of metal parts joined together by a filler metal comprising an indium-containing silver brazing alloy consisting essentially by weight of about 40% to 65% Ag, about 6 to 12% In, about 6 to 12% Zn, up to about 0.5% Si and the balance essentially copper ranging from about 23% to 36%.

4,052,532

ELECTROLYTE-ELECTRODE ASSEMBLY FOR A COMBUSTIBLE BATTERY

Helmut Tannenberger, Geneva, and Paul van den Berghe, Satigny, both of Switzerland, assignors to Compagnie Francaise de Raffinage, Paris, France

Filed Nov. 18, 1975, Ser. No. 633,075
Claims priority, application Switzerland, Nov. 19, 1974, 15356/74
Int. Cl.² H01M *8/10*
U.S. Cl. 429—33 **4 Claims**

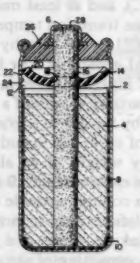
1. In an electrolyte-electrode assembly for a combustible battery comprising a ceramic solid electrolyte conductive to oxygen ions and impermeable to gas, an electrode comprising a porous layer of indium oxide doped with tin, said layer being composed of dendrites which form trunks having a diameter between 500 and 10,000 A and whose principal axes are perpendicular to the surface of the electrolyte, an improvement comprising a continuous layer of ceramic material, conductive to oxygen ions and electrons, interposed between the electrolyte and the electrode and united therewith to form a composite layered assembly, said ceramic material being a solid solution of mineral oxides comprising zirconium oxide, uranium oxide and at least one oxide selected from the group consisting of calcium oxide, magnesium oxide, barium oxide, strontium oxide, scandium oxide, yttrium oxide, ytterbium oxide and oxides of rare earths.

4,052,533

PRESSURE RELIEF FLAPPER VENT VALVE FOR GALVANIC CELLS

Henry Heinz, Jr., Berea, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,673
Int. Cl.² H01M *2/12*
U.S. Cl. 429—54 **13 Claims**



1. A galvanic cell comprising a container having an open end and an inner disposed anode; a depolarizer-cathode within said container; a porous separator disposed between said anode and said cathode; an electrolyte wetting said depolarizer-cathode; a current collector rod embedded within and projected

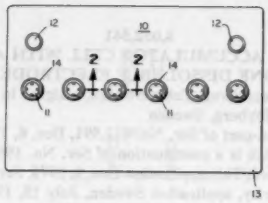
above said depolarizer-cathode; and a resealable flapper vent valve disposed concentrically about the current collector rod over the depolarizer-cathode and contacting the inner wall of the container so as to provide a vent at the valve-container interface for releasing excessive gas pressure within the container, said resealable flapper vent valve comprising a resilient, deformable cupped annulus having an opening at its center through which the top of the current collector rod passes, contacts and projects above, and having its peripheral edge segment deflected upwardly such that at least the bottom peripheral edge of the annulus contacts the inner wall of the container.

4,052,534

BATTERY VENT PLUG

John L. Devitt, Denver, Colo., assignor to General Battery Corporation, Reading, Pa.

Filed May 3, 1973, Ser. No. 356,826
Int. Cl.² H01M 2/12
U.S. Cl. 429—86 **1 Claim**



1. A battery vent plug for insertion into at least one battery vent well to vent and otherwise seal said well, comprising: a hollow upper cylindrical member having a top surface with at least one vent aperture defined therein; a hollow lower cylindrical member having an upper surface defining at least one aperture in said upper surface, at least a portion of said lower cylindrical member being fitted within and matingly engaging the interior surface of said upper cylindrical member; a gas permeable diaphragm sealingly engaging said upper surface of said lower cylindrical member at least around said aperture defined therein, said diaphragm being retained between generally opposing surfaces of said cylindrical members; an o-ring gasket positioned around the outer cylindrical surface of said lower cylindrical member for engaging the interior walls of the battery case vent well to provide a gas-tight seal against said battery case vent well when said plug is disposed therein, said o-ring gasket having a greater diameter than that of said vent well so that upon insertion of said plug into said vent well said o-ring is compressed between said vent well and the remainder of said plug; and a retaining means for retaining said gasket with respect to said plug comprising an annular ridge formed on the exterior surface of said lower cylindrical member, said ridge cooperating with the lower end of said upper cylindrical member to retain said o-ring gasket therebetween.

4,052,535

SODIUM-SULPHUR CELLS

Graham Robinson, Chester; Michael Patrick Joseph Brennan, Warrington, and Ivor Wynn Jones, Chester, all of England, assignors to Chloride Silent Power Limited, England

Filed Aug. 19, 1976, Ser. No. 715,800
Claims priority, application United Kingdom, Aug. 20, 1975, 34680/75
Int. Cl.² H01M 10/39
U.S. Cl. 429—104 **15 Claims**

1. In a sodium-sulphur cell having a solid electrolyte and a cathode current collector with a porous conductive matrix in the region between the electrolyte and the current collector, the improvement in combination therewith comprising the matrix being formed of a plurality of discrete elements with electronically conductive material of a higher bulk conductivity than the matrix elements positioned between the elements

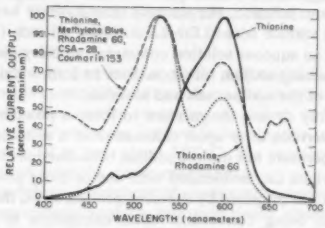
and extending across the region between the current collector and the electrolyte to increase the conductivity across that region.

4,052,536

ELECTROLYTES WHICH ARE USEFUL IN SOLAR ENERGY CONVERSION

Norman N. Lichtin, Newton Center, and Peter D. Wildes, Belmont, both of Mass., assignors to The Trustees of Boston University, Boston, Mass.

Filed June 24, 1976, Ser. No. 699,725
Int. Cl.² H01M 4/36
U.S. Cl. 429—105 **7 Claims**


Thionine, Methylene Blue, Rhodamine 6G, CSA-28, Coumarin 153
Thionine
Thionine, Rhodamine 6G
RELATIVE CURRENT OUTPUT (percent of maximum)
WAVELENGTH (nanometers)

1. An electrolyte for use in a photogalvanic cell comprising a solvent having a thiazine dye and a photosensitizing dye dissolved therein, said photosensitizing dye being selected from the group consisting of Rhodamine 6G, CSA-28, and a combination of both.

4. In an electrolyte solution useful in the photochemical conversion of solar energy, said electrolyte containing a photoreducible thiazine dye and a redox couple, the improvement of including in said electrolyte solution a photosensitizing dye selected from the group consisting of Rhodamine 6G, CSA-28, and a combination of both.

4,052,537

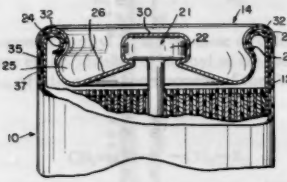
ELECTRICAL DEVICE

Henry Rogers Mallory, Greenwich, Conn., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Filed Oct. 1, 1976, Ser. No. 728,672
Int. Cl.² H01M 2/04
U.S. Cl. 429—174 **15 Claims**

1. An electrochemical cell comprising a pressurized container having a cylindrical can body with a cylindrical side wall, a closed bottom end and an open upper end, the upper open end of said can body being curled to the shape of a torus,

the innermost portion of which has a diameter not greater than the diameter of said can body; a closure for said container, said closure comprising a metallic element having a curved lip crimped against said torus; means to insulate said can body



from said cover; an anode, a cathode and an electrolyte operatively positioned within said container, one of said anode or cathode being electrically connected to said can body and the other being electrically connected to said cover.

4,052,538

METHOD OF MAKING SODIUM BETA-ALUMINA POWDER AND SINTERED ARTICLES

David S. Eddy, Romeo, and James F. Rhodes, Hartland, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 19, 1976, Ser. No. 678,063
Int. Cl.[2] H01M *6/18*; C04B *35/64*
U.S. Cl. 429—193 **6 Claims**

1. A method of making a powdered precursor material containing a uniform mixture of constituents for producing a sodium beta-alumina comprising

dispersing an alpha-alumina monohydrate in a dilute acidic aqueous solution, the alumina monohydrate having sufficient surface area to form a colloidal solution (sol),

adding an aqueous solution containing an inorganic oxygen-containing sodium salt to said sol to form a uniform mixture of the sodium salt and alumina,

and spray drying the mixture to form a powder which is convertible as is upon calcination at a suitable elevated temperature to a desired sodium beta-alumina composition or which can be blended with one or more powder compositions prepared by the same process steps, the resulting blend being convertible upon calcination to a desired sodium beta-alumina.

4,052,539

ELECTROCHEMICAL CELL WITH A GRAHITE INTERCALATION COMPOUND CATHODE

Joseph A. Shropshire, and Gerald H. Newman, both of Westfield, N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 17, 1977, Ser. No. 760,156
Int. Cl.[2] H01M *6/14*
U.S. Cl. 429—194 **9 Claims**

1. A battery comprising:

a. an alkali metal anode;

b. a cathode containing as the cathode-active material a compound of graphite formed by reacting ClF_3 and a Lewis acid fluoride of an element selected from B, Si, Ge, Sn, Pb, P, As, Sb, Bi, Ti, Zr, Hf, V, Nb and Ta in the presence of liquid HF whereby said graphite compounds contain from about 30 wt. % to about 55 wt. % carbon;

c. a nonaqueous electrolyte which does not chemically react with said anode or said cathode and which will permit the migration of ions from said anode-active material to said cathode-active material.

4,052,540

SUBSTANTIALLY NON-GASSING ALKALI RESISTANT BATTERY SEPARATOR AND METHOD OF PRODUCING SAME

Joseph S. Smatko, Santa Barbara, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Nov. 16, 1970, Ser. No. 89,865
Int. Cl.[2] H01M *2/16*
U.S. Cl. 429—229 **8 Claims**

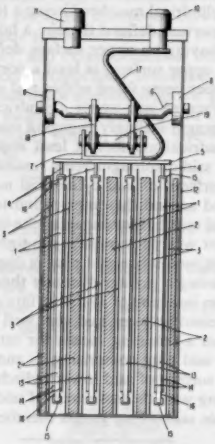
1. A substantially non-gassing high alkali resistant battery separator when employed with a zinc electrode, and having low resistivity, and inhibiting effect on zinc dendrite formation, in the form of a porous member consisting essentially os sintered particles of a single phase solid solution of about 60 to about 99 mol percent magnesium silicate and about 1 to about 40 mol percent zinc silicate.

4,052,541

ELECTRIC ACCUMULATOR CELL WITH AT LEAST ONE DISSOLUBLE ELECTRODE

Otto von Krusenstierna, Taby, Sweden, assignor to Aktiebolaget Tudor, Sundbyberg, Sweden

Continuation-in-part of Ser. No. 422,591, Dec. 6, 1973, Pat. No. 3,923,550, which is a continuation of Ser. No. 186,219, Oct. 4, 1971, abandoned. This application Dec. 1, 1975, Ser. No. 636,656
Claims priority, application Sweden, July 15, 1975, 7508111
Int. Cl.[2] H01M *4/70*
U.S. Cl. 429—233 **14 Claims**



1. In an electric accumulator cell including at least one electrode formed of an inert conducting material insoluble in said electrolyte and an active metal which on discharge formed a chemical compound soluble in the electrolyte, the improvement which comprises forming said electrode of a central conducting layer having an outer layer disposed on both planar sides thereof, the planar sides of the outer layers being smaller than the planar sides of the central layer so that the central layer has a bare portion about its periphery, at least part of the bare portion being covered with an electrically insulating material, the width of the bare portion between the insulating material and the outer layer being at least twice the thickness of the outer layer, each layer being composed of an inert conducting material insoluble in said electrolyte.

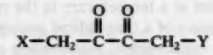
4,052,542

HALO-ACETYL HIGH GREEN STRENGTH RUBBERS

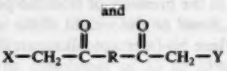
Yung-Kang Wei, and Zbigniew Jack Lobos, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada

Filed Mar. 26, 1976, Ser. No. 670,967
Int. Cl.[2] C08F 8/18, 8/00
U.S. Cl. 526—46 13 Claims

1. A process of preparing a synthetic rubber composition of improved green strength, which comprises reacting an emulsion polymerized rubbery polymer of a C_4–C_6 conjugated diolefin or a rubbery polymer thereof with a C_8–C_{10} vinyl or vinylidene substituted aromatic hydrocarbon or with a C_3–C_5 vinyl compound having a nitrile group, the rubbery polymer having from about 0.5 to about 10 millimoles per 100 grams of polymer of bound tertiary amine groups incorporated therein by copolymerization with a monomer selected from dimethylaminoethyl acrylate, dimethylaminoethyl methacrylate, diethylaminoethyl acrylate and diethylaminoethyl methacrylate, with a halogen compound, characterized in that the halogen compound has a general formula selected from the group consisting of



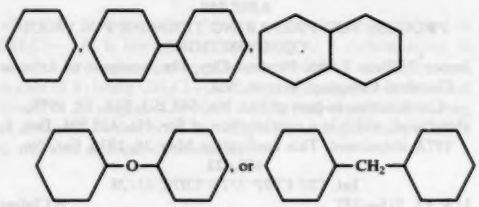
and



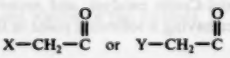
wherein X and Y each represent one of chlorine, bromine or iodine and wherein R represents

a. an alkylene group selected from $—CH_2—$, $—CH_2—CH_2—$, $—CH(CH_3)—$ and $—C(CH_3)_2—$, or

b. an aromatic group selected from



each of which may additionally contain one or more C_1 to C_4 alkyl substituents on any of the aromatic nuclei, and the location of each



group is at any of the ortho, meta or para-positions of the aromatic nucleus and in separate aromatic nuclei except where R represents

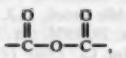
4,052,543

VULCANIZABLE AND VULCANIZED COMPOSITIONS CONTAINING POLYPEROXIDE

Wilbur H. McKellin, St. Louis, Mo.; Orville L. Mageli, and Antonio Joseph D'Angelo, both of Buffalo, N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 285,857, June 6, 1963. This application Sept. 30, 1969, Ser. No. 866,420
Int. Cl.[2] C08F 8/06, 8/42
U.S. Cl. 526—48 16 Claims

1. A vulcanizable composition comprising an intimate mixture of a polymeric compound capable of being cross-linked to form a thermoset material, and cross-linking agent in an amount sufficient to afford about the desired degree of cross-linking, which agent is a polyperoxy compound having at least two peroxy groups, one of the oxygens of each of two of said peroxy groups being linked to a common carbon atom and each of the other oxygens being linked to a tertiary atom of an organo member which tertiary atom is selected from the class consisting of carbon and silicon and said common carbon atom being part of an aliphatic group selected from those having 2–3 or 5–6 carbons plus at least one carboxy group and those having 4 carbons plus at least one carboxy group selected from—COOH, —COOM and



where M is a metal ion.

4,052,544

ETHYLENE POLYMERIZATION CATALYSTS

William L. Kehl, Pittsburgh, Pa., and Thomas J. Lynch, Orange, Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed July 6, 1976, Ser. No. 702,565
Int. Cl.[2] C08F 4/02, 4/12, 4/24, 10/00
U.S. Cl. 526—102 7 Claims

1. A process for preparing an olefin polymerization catalyst which consists essentially of depositing a chromium compound upon an inorganic carrier containing aluminum and arsenate moieties and activating the catalyst by heating the material to a temperature of at least about 350° C., the inorganic carrier being selected from the group consisting of:

a. an amorphous precipitate of aluminum arsenate,

b. an amorphous coprecipitate containing aluminum and arsenate moieties in proportions such that the aluminum and arsenic are present in an atomic ratio of between 5:1 and 1:1, and

c. mixtures of (a) and (b);

said carrier having been prepared by neutralizing a strongly acidic solution containing aluminum and arsenic ions in proportions such that the aluminum and arsenic are present in an atomic ratio in the range of 5:1 to 1:1 to form a solid precipitate containing aluminum and arsenate moieties, and recovering the precipitate.

4,052,545

PROCESS FOR POLYMERIZING CONJUGATED DIENES

Adel Farhan Halasa, Bath, and Richard Gutierrez, Akron, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 458,951, April 8, 1974, Pat. No. 3,948,869. This application Feb. 11, 1976, Ser. No. 657,123
The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.
Int. Cl.[2] C08F 4/64, 236/04, 236/06, 236/08
U.S. Cl. 526—140 19 Claims

1. A process for the hydrocarbon solution polymerization of a monomer composition consisting essentially of 10–95 percent by weight of a conjugated diene and 5–90 percent by weight of

an alpha olefin having 2–8 carbon atoms to produce a copolymer having 5–90 percent of the alpha olefine in the resultant copolymer comprising the steps of maintaining said monomer composition at a temperature of −10° to 70° C. in intimate contact with a catalyst composition consisting essentially of:

a. A metal halide compound having the formula $TiBr_nCl_{4-n}$ or VBr_mCl_{5-m} wherein n has a value of 0–4 and m has a value of 0–5;

b. An aluminum hydrocarbon compound having the formula R_2AlX or $RAlX_2$ wherein X is Cl, Br or H, and R is a hydrocarbon group having 1–8 carbon atoms selected from alkyl, aryl and cycloalkyl groups, and

c. CS_2;

the proportion of said metal halide compound being 1–10 millimoles per 100 grams of said monomer composition; the proportion of said aluminum compound being 0.9–3 moles per mole of metal halide compound; and the proportion of said CS_2 being 0.01–0.5 mole per mole of said metal halide compound, said polymerization being conducted for a period of at least 1 hour.

4,052,546

PROCESS FOR THE PRODUCTION OF VINYL HALIDE POLYMERS

Robert J. Stanaback, Gladstone, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Oct. 29, 1976, Ser. No. 736,920
Int. Cl.² C08F *14/06*
U.S. Cl. 526—206 **7 Claims**

1. In the process for the polymerization of a monomer component selected from the group consisting of vinyl halides and mixtures of vinyl halides with at least one ethylenically-unsaturated monomer that is copolymerizable therewith, said mixtures containing at least 70% by weight of the vinyl halide, in an aqueous medium at a temperature in the range of 40° to 80° C. in the presence of a free radical generating polymerization initiator, the improvement that consists of conducting the polymerization in the presence of from 0.05 percent to 2.0 percent by weight, based on the weight of the monomer component, of a polybromobutene having the formula $C_4Br_nH_{8-n}$, wherein n represents a number in the range of 4 to 8.

4,052,547

PROCESS FOR POLYMERIZING DIOLEFIN COPOLYMERS EMPLOYING A CATALYST MIXTURE OF HYDROPEROXIDES

Howard K. Foley, Cuyahoga Falls; David A. Hutchings, Stow, and Terry C. Neubert, Ravenna, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 1, 1976, Ser. No. 691,967
Int. Cl.² C08F *4/38, 2/00, 4/42, 236/00*
U.S. Cl. 526—212 **2 Claims**

1. In a method of producing a polymeric material comprised of polymerizing at least one unsaturated organic compound, selected from a mixture of 1,3-butadiene and styrene or a mixture of isoprene and styrene, in an aqueous emulsion in the presence of a free radical generating redox catalyst comprised of a reducing component and an oxidizing component, said oxidizing component is a composite prepared by (A) obtaining the oxidation product of reacting p-diisopropylbenzene with oxygen under relatively harsh temperature conditions at a temperature in the range of about 100° to about 120° C. comprised of a mixture of p-diisopropylbenzene hydroperoxide and byproducts comprised at least about 90 weight percent of phenols, enols and ketones, and unreacted p-diisopropylbenzene and (B) removing by separation a major portion of said p-diisopropylbenzene dihydroperoxide and unreacted p-diisopropylbenzene and a minor portion of said p-diisopropylbenzene hydroperoxide to effect a concentration of the remainder of the mixture as a distilland having an equivalent monohydroperoxide content by ASTM No. E-298-68 in the range of about 70 to about 90 percent comprised, by weight of about 45 to about 65 percent p-diisopropylbenzene monohydroperoxide about 5 to about 15 percent p-diisopropylbenzene dihydroperoxide and about 10 to about 30 percent said byproducts containing primarily phenols, enols and ketones, where said remainder distilland mixture is enhanced by (C) diluting with at least one alcohol selected from methanol, ethanol and isopropanol, to render the composite a free flowing liquid having hydroperoxide equivalent concentration according to ASTM No. E-298-68 in the range of about 40 to about 60 percent.

4,052,548

PROCESS FOR THE POLYMERIZATION OF VINYL HALIDES IN THE PRESENCE OF AN ALKYLENE BIS-(MERCAPTOALKANOATE)

Robert J. Stanaback, Gladstone, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Oct. 29, 1976, Ser. No. 736,921
Int. Cl.² C08F *14/06*
U.S. Cl. 526—214 **7 Claims**

1. In the process for the polymerization of a monomer component selected from the group consisting of vinyl halides and mixtures of vinyl halides with at least one ethylenically-unsaturated monomer that is copolymerizable therewith, said mixtures containing at least 70% by weight of vinyl halide, in an aqueous medium at a temperature in the range of 40° C. to 80° C. in the presence of a free-radical generating polymerization initiator, the improvement that consists of conducting the polymerization in the presence of from 0.5 percent to 1.0 percent by weight, based on the weight of the monomer component, of an alkylene bis-(mercaptoalkanoate) having the structural formula

$$HS-(CH_2)_n-\underset{\underset{O}{\|}}{C}-O-(CH_2)_m-O-\underset{\underset{O}{\|}}{C}-(CH_2)_n-SH$$

wherein m represents a number in the range of 1 to 6 and each n represents a number in the range of 1 to 3.

4,052,549

PROCESS FOR PREPARING TERPENE POLYMER COMPOSITIONS

James William Booth, Panama City, Fla., assignor to Arizona Chemical Company, Wayne, N.J.

Continuation-in-part of Ser. No. 549,233, Feb. 12, 1975, abandoned, which is a continuation of Ser. No. 422,394, Dec. 6, 1973, abandoned. This application May 24, 1976, Ser. No. 689,421
Int. Cl.² C08F *4/14*; C07C *13/28*
U.S. Cl. 526—237 **6 Claims**

1. A process for the preparation of low softening point resinous terpene polymer having a softening point in the range of approximately 0° C. to 85° C. which comprises: polymerizing 20 to 80 parts, by weight, of a terpene hydrocarbon monomer or mixtures of the same with 80 to 20 parts, by weight, of an oligomer of a cyclic monoterpene hydrocarbon in the presence of a Friedel-Crafts catalyst, and recovering a resinous terpene polymer having a softening point in the range of 0° C. and 85° C.

4,052,550

POLY(VINYLIDENE FLUORIDE) YARNS AND FIBERS

Pierre Chion, Bron, and Robert Cuidard, Ecully, both of France, assignors to Rhone-Poulenc-Textile, France

Division of Ser. No. 474,585, May 30, 1974, Pat. No. 3,965,232. This application Jan. 29, 1976, Ser. No. 653,654
Claims priority, application France, June 6, 1973, 73.20666
Int. Cl.² C08F *14/22, 114/22*
U.S. Cl. 526—255 **3 Claims**

1. Polyvinylidene fluoride yarns and fibers having a dry tenacity of at least 33 g/tex and an improved structure as

measured by their secondary swelling values of up to 20% prepared by

spinning a solution of polyvinylidene fluoride having a fluidity index at 250° C of at least 10 into a coagulating bath containing 45 to 60% by weight of an aprotic polar organic solvent and 40 to 55% by weight of water maintained at a temperature between 15° and 40° C,

stretching the filaments in air at a temperature between 15° and 40° C to a ratio of between 1.5× and 5×,

then stretching the filaments in boiling water to a ratio of between 1.5× and 4×, the overall stretch ratio being between 3× and 6.5×, and

then washing the filaments with water maintained at a temperature between 15° C and 40° C at room temperature.

4,052,551

FLAMEPROOFED MODACRYL COPOLYMERS, FIBERS AND FILAMENTS CONTAINING CARBOXY PHOSPHINIC ACID DERIVATIVES HAVING IMPROVED THERMOSTABILITY

Bernd Huber, Hofheim, Taunus; Hans-Jerg Kleiner, Kronberg, Taunus, and Hubert Neumaier, Knapsack, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

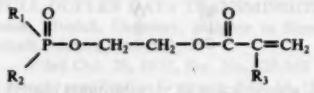
Filed Oct. 17, 1975, Ser. No. 623,336

Claims priority, application Germany, Oct. 19, 1974, 2449468; Oct. 19, 1974, 2449467

Int. Cl.[2] C08F *30/03, 230/02, 26/06, 4/30*

U.S. Cl. 526—278 **3 Claims**

1. A modacrylic copolymer of 35 to 85% by weight of acrylonitrile, 5 to 45% by weight of vinyl chloride, vinyl bromide, vinylidene chloride or a mixture thereof and 5 to 30% by weight of a carboxy phosphinic acid of the formula



where R_1 is lower alkyl having up to 8 carbon atoms, or CH_2Cl—, R_2 is lower alkyl having up to 8 carbon atoms in which a hydrogen atom may be substituted by a halogen atom in case of R_1 being CH_2Cl—, and R_3 is hydrogen or methyl, and from 0 to 15 weight % of other unsaturated compounds having an activated double bond the weight percentages being relative to the total amount of monomers.

4,052,552

THROMBOXANE B ANALOGS

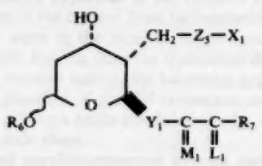
William P. Schneider, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Aug. 20, 1976, Ser. No. 716,446

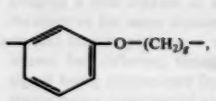
Int. Cl.[2] C07D *309/10, 309/36, 309/38*

U.S. Cl. 542—413 **49 Claims**

1. A thromboxane alanog of the formula

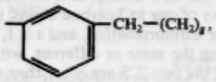


wherein Z_5 is



(1)

or



(2)

wherein g is 1, 2, or 3;

wherein X_1 is

1. $—CH_2OH$, or
2. $—COOR_1$, wherein R_1 is alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one or two chloro, fluoro, or alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation;

wherein R_6 is hydrogen or alkyl of one to 4 carbon atoms, inclusive;

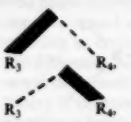
wherein Y_1 is trans—CH=CH— or $—CH_2CH_2—$;

wherein M_1 is

or

wherein R_5 is hydrogen or methyl;

wherein L_1 is



or a mixture of

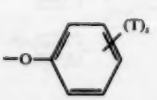
and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;

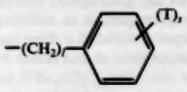
wherein R_7 is

1. $—(CH_2)_m—CH_3$,

(2)



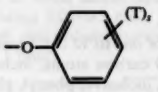
or



(3)

wherein l is 0, 1, 2, or 3,

wherein *m* is 1 to 5, inclusive, T is alkyl of 1 to 3 carbon atoms, inclusive, alkoxy of one to 3 carbon atoms, inclusive, chloro, fluoro, or trifluoromethyl, and *s* is 1, 2, or 3, the various T's being the same or different, with the proviso that not more tha two T'S are other than alkyl, with the further proviso that R_7 is



only when R_3 and R_4 are hydrogen or methyl, being the same or different.

4,052,553

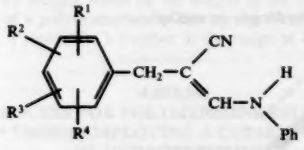
5-BENZYL PYRIMIDINES INTERMEDIATES THEREFORE, AND METHOD

Ronald M. Cresswell, Scarsdale; John W. Mentha, Hartsdale, and Russell L. Seaman, Chappaqua, all of N.Y., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 16,606, March 4, 1970, Pat. No. 3,697,512.
This application June 15, 1972, Ser. No. 263,204
Int. Cl.[2] C07C *87/24;* C09B *23/00*
U.S. Cl. 542—469 **22 Claims**

1. Compound according to formula I

I



in which Ph is aryl of 6 to 12 carbon atoms which may be substituted in one, two or three positions with lower alkyl, lower alkoxyl, or halogen, a compound in which R^1, R^2, R^3 and R^4 are the same or different, and each is a hydrogen or halogen atom, lower alkyl, lower alkoxy or benzyloxy, or R^3 and R^4 taken together may be methylendioxy group when both R^1 and R^2 are hydrogen atoms and wherein lower alkyl and lower alkoxyl contain 1 to 4 carbons in the above.

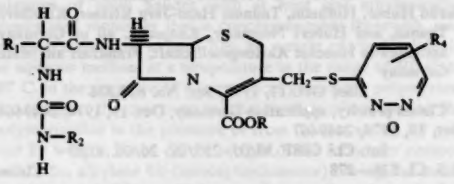
4,052,554

OXOPYRIDAZINYLTHIOMETHYL DERIVATIVES OF UREIDOCEPHALOSPORINS

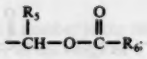
Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 611,041, Sept. 8, 1975, Pat. No. 3,996,218.
This application Aug. 16, 1976, Ser. No. 714,890
Int. Cl.[2] C07D *501/36;* A61K *31/545*
U.S. Cl. 544—26 **12 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, tri(lower alkyl)silyl, trihaloethyl, a salt forming ion, or



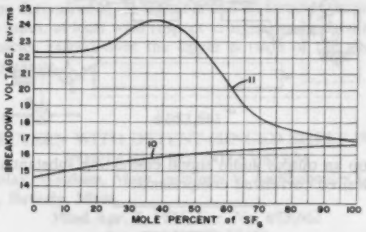
R_1 is phenyl, phenyl-lower alkyl, substituted phenyl, or substituted phenyl-lower alkyl wherein said substituent is one to three members selected from the group consisting of halogen, lower alkyl, lower alkoxy, and hydroxy; R_2 is hydrogen or lower alkyl; R_4 is hydrogen, halogen, lower alkyl of 1 to 4 carbons, or lower alkoxy of 1 to 4 carbons; R_5 is hydrogen or lower alkyl; and R_6 is lower alkyl, phenyl, or phenyl-lower alkyl.

4,052,555

GASEOUS DIELECTRIC COMPOSITIONS

Whitney H. Mears, Buffalo, and Sabatino R. Orfeo, Orchard Park, both of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed July 23, 1975, Ser. No. 598,303
Int. Cl.[2] H05K 5/00; H01B 3/56
U.S. Cl. 174—17 GF 12 Claims



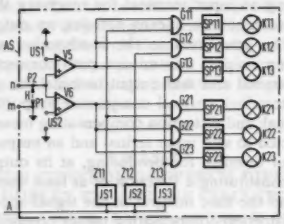
1. A process for substantially eliminating carbon tracking formation in a dielectric fluid during an electrical discharge from an electrical conductor which comprises maintaining in contact with the electrical conductor during operation a gaseous dielectric composition consisting essentially of a mixture of at least one perfluorinated ether with from about 1 to 99 mole percent of SF_6 and/or with from about 1 to 75 mole percent of CO_2, said perfluorinated ether containing from 2 to 6 carbon atoms and having a vapor pressure of at least of about 100 Torr at 20° C.

4,052,556

CIRCUIT ARRANGEMENT FOR BALANCING A TWO WIRE FULL DUPLEX DATA TRANSMISSION SYSTEM

Adolf Haass, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 28, 1975, Ser. No. 625,869
Claims priority, application Germany, Nov. 14, 1974, 2454108
Int. Cl.[2] H04L 5/14
U.S. Cl. 178—60 11 Claims



1. In a two wire, full duplex data transmission system wherein a transmitter and receiver in one station are connected by two wires to a transmitter and receiver in another station, the transmitter in each station being connected by means of a balancing apparatus to the receiver therein for adjusting the value of the current from the transmitter flowing through said two wires to the receiver in the same station to be equal to current flowing from the transmitter directly to the receiver in said another station, the balancing apparatus comprising.

a plurality of parallel-connected current paths, each comprising a series combination of a time stage and an amplitude stage,

said parallel-connected current paths being connected to received current from the transmitter in the same station, a plurality of subsidiary currents flowing through said parallel current paths to a common output terminal which couples a sum current of said subsidiary currents to the receiver in the same station,

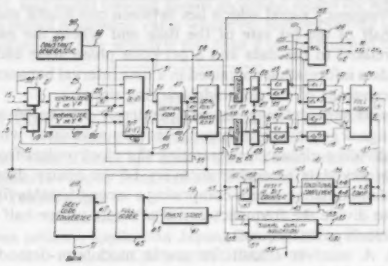
each said time stage being constructed to produce predetermined, but different, timing signals in relation to a data signal being transmitted from the station, said amplitude stages being constructed to adjust the values of said subsidiary currents flowing therethrough and said time and amplitude stages having a connected relationship such that each said amplitude stage is effective for a duration determined by the timing signal from the associated time stage.

4,052,557

PHASE-JUMP DETECTOR AND CORRECTOR METHOD AND APPARATUS FOR PHASE-MODULATED COMMUNICATION SYSTEMS THAT ALSO PROVIDES A SIGNAL QUALITY INDICATION

Ran-Fun Chiu, Miami; James Bryon Sherman, North Miami, and Judson Truman Gilbert, Hialeah, all of Fla., assignors to Milgo Electronic Corporation, Miami, Fla.

Filed July 31, 1975, Ser. No. 600,608
Int. Cl.[2] H04L 27/24
U.S. Cl. 178—67 28 Claims



1. A method for detecting the occurrence of phase-jumps in a phase-modulated voice-band communication system wherein received phase symbols are converted into binary X and binary Y components, said method comprising:

generating an error X and error Y indication that represents the difference between the binary X and binary Y components of a received symbol and the ideal binary X and binary Y components of that symbol;

generating a rotated error X and rotated error Y indication that represents the difference between the binary X and binary Y components of and received symbol rotated by N degrees and the ideal binary X and binary Y components of the rotated symbol; and

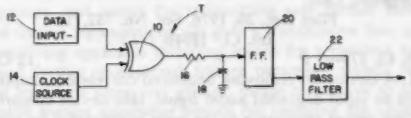
comparing the magnitude of the error X and error Y indication with the rotated error X and rotated error Y indication.

4,052,558

DATA TRANSMISSION SYSTEM

Colin Davey Patterson, 65 Downsview Crescent, Ottawa, Ontario, Canada

Filed Dec. 9, 1974, Ser. No. 530,710
Int. Cl.[2] H04B 1/00
U.S. Cl. 178—68 24 Claims



1. A modem adopted for phase modulated digital data trans-

mission over information communication links without the necessity of a carrier signal, said modem comprising:

a. input means for receiving input data in a digital binary format,

b. clocking means for generating a series of clock pulses based on one-half time intervals with respect to the bit rate of the input data,

c. an exclusive OR gating means operatively connected to said input means and said clocking means to receive the data and clock pulses and generate an output pulse train in encoded waveform and where the pulses in said train have widths which are a function of the binary data and are bandwidth constrained,

d. a bistable dividing circuit comprised of a first bistable flip-flop operatively connected to said exclusive OR gating means to reduce the number of pulses in said output pulse train to a lesser number of pulses, said lesser number of pulses being directly related to the pulses in said output pulse train, but which have greater bandwidth and which are also bandwidth constrained in order to reduce the frequency spectrum occupied by a phase transition,

e. signal generating means operatively associated with said dividing circuit to receive the output thereof to thereby provide a two level phase modulated sinusoidal varying frequency signal which lies between one-fourth and one-half of the bit rate of the data and where the phase is related to the data and a previous phase state and with data information contained in a time interval between zero crossings of the sinusoidal varying signal,

f. said demodulating means operatively connected to said signal generating means operatively associated with said dividing circuit for separating the clock pulses from the binary data to enable recovery of the binary data, said demodulating means comprising a second bistable flip-flop to divide the frequency signal at a rate of one-half of the clock pulse frequency.

18. A receiver circuit for use in modulator-demodulator devices which transmit and receive data with respect to information communication links, said circuit comprising:

a. input means to receive a phase modulated sinusoidal varying frequency signal containing information representing both binary data and clock pulses and which signal lies between one-fourth and one-half of the bit rate of the data,

b. polarity detection means operatively connected to said input means to determine the polarity of certain portions of the signal existing between selected zero crossings thereof and generating a digital pulse train where the pulses of said pulse train have widths which are a function of the binary data,

c. differential phase detection means including at least one first bistable device operatively connected to the output of said polarity detection means to measure the instantaneous time change of phase of the frequencies and compare same to a recovered phase reference based on a previous phase change and to thereby generate a serial clock output,

d. and at least one second bistable device operatively connected to the output of said differential phase detection means to generate a binary data output.

4,052,559

NOISE FILTERING DEVICE

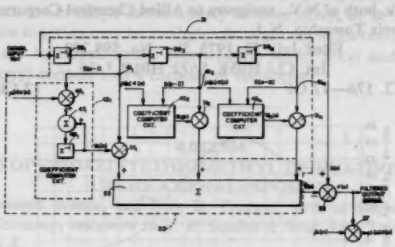
James E. Paul, Anaheim, and Visvaldis A. Vitols, Orange, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 20, 1976, Ser. No. 752,711
Int. Cl.[2] H04B *1/12*
U.S. Cl. 179—1 P **12 Claims**

1. A device for removing undesired correlated components from an input degraded audio signal, said device comprising:

filter means responsive to the input audio signal for substantially estimating only the undesired correlated components of the input audio signal; and

a combiner for substracting the input audio signal from the estimate of the undesired correlated components to develop an output audio signal containing substantially no undesired correlated components.

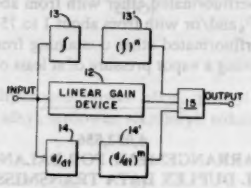


4,052,560

LOUDSPEAKER DISTORTION REDUCTION SYSTEMS

John Bryant Santmann, 66 Cedar Lane, Babylon, N.Y. 11702

Filed June 3, 1976, Ser. No. 692,302
Int. Cl.[2] H04R *3/04*
U.S. Cl. 179—1 D **10 Claims**



1. An electrical circuit unit arranged to be connected between a source of a time-varying electrical signal composed of frequency components extending across the audio frequency range and a loudspeaker having an electrical signal input to cause the sound output of the loudspeaker to constitute an accurate representation of the electrical signal, comprising: means defining an input terminal for receiving the electrical signal from such source; means defining an output terminal arranged to be connected to the loudspeaker signal input; means defining a signal transmission path connected between said input terminal and said output terminal for supplying to said output terminal a signal component proportional to the electrical signal; and distortion compensating means having an input connected to said input terinal and an output connected to said output terminal for producing, at its output, a signal component constituting a function of at least one of the time derivative and the time integral of the signal appearing at its input, said distortion compensating means comprising integrator means and function generator means connected for supplying to said distortion compensating means output a signal proportional to a predetermined non-linear function of the time integral of the signal appearing at its said input, at least with respect to signal components whose frequencies extend over the lower portion of the audio frequency range.

6. An electrical circuit unit arranged to be connected between a source of a time-varying electrical signal composed of frequency components extending across the audio frequency range and a loudspeaker having an electrical signal input to cause the sound output of the loudspeaker to constitute an accurate representation of the electrical signal, comprising: means defining an input terminal for receiving the electrical signal from such source; means defining an output terminal arranged to be connected to the loudspeaker signal input; means defining a signal transmission path connected between said input terminal and said output terminal for supplying to said output terminal a signal component proportional to the

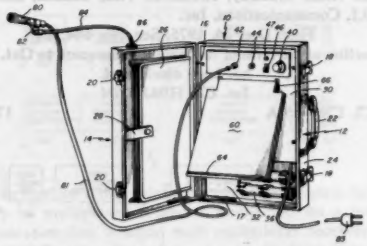
electrical signal; and distortion compensating means having an input connected to said input terminal and an output connected to said output terminal for producing, at its output, a signal component constituting a function of at least one of the time derivative and the time integral of the signal appearing at its input, wherein said distortion compensating means comprise differentiator means and function generator means connected for supplying to said distortion compensating means output a signal proportional to a predetermined non-linear function of the time derivative of the signal at said distortion compensating means input, at least with respect to signal components whose frequencies extend over the upper portion of the audio frequency range.

4,052,561

LECTERN WITH DETENT-HINGED SHELF FOR PORTABLE SOUND SYSTEM

Ira Molay, Wenham, Mass., assignor to Audiophonics Corporation, Beverly, Mass.

Filed Apr. 5, 1976, Ser. No. 673,663
Int. Cl.² H04R *27/00*
U.S. Cl. 179—1 AT **9 Claims**



1. For a portable sound system having a carrying case and circuit means disposed in the carrying case including an amplifier circuit and speaker, the improvement comprising; plate means forming at least part of a lectern having a lower edge flange permitting papers or the like to be held on the plate means when the plate means is in a tilted position, a panel fixedly mounted in the carrying case, and means for supporting the plate means in the case in either of two positions, said plate supporting means comprising tabs extending from the panel and pivot pins engagable with slots in the tabs, said plate means having on opposite sides at its top end extensions passing through respective holes in the panel with the pivot pins also engaging with the extensions.

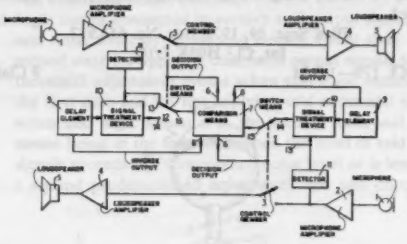
4,052,562

SYSTEM FOR CONTROL OF SPEECH DIRECTION IN DUPLEX TELEPHONE CIRCUITS

Bjorn Andersen, Osteras, Norway, assignor to Maxman AG, Chur, Switzerland

Filed Oct. 20, 1975, Ser. No. 624,250
Claims priority, application Norway, Oct. 29, 1974, 743893
Int. Cl.² H04M *1/60*
U.S. Cl. 179—1 HF **5 Claims**

1. In apparatus for control of the speech direction in a duplex telephone system having at least a pair of stations interconnected by a single telephone line wherein each station includes a transmitting channel for transmitting a signal representative of the acoustic signals detected at the other channel at each station and includes a transmitting switch means for selectively connecting the transmitting channel to the telephone line, a receiving switch means for selectively connecting the receiving channel to the telephone line and duplex control means connected to the transmitting switch means and the receiving switch means for permitting only one of the channels to be connected with the telephone line to prevent feedback of signal from the receiving channel to the transmitting channel at each station; the improvement in which said duplex control means includes signal treating means connected to said transmitting channel for calculating and storing a regulating value dependent upon the envelope curve of the signal from the transmitting channel wherein the regulating value is equivalent to the factor by which the transmitting signal must be multiplied at any given time to be equal to the receiving signal when the transmitting signal is representative substantially of an acoustic feedback of the signal being received by the receiving channel, said signal treating means including means for adjusting the stored regulating value whenever said regulating value is changing at a rate which is less than a predetermined rate.

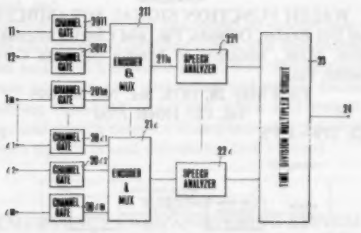


4,052,563

MULTIPLEX SPEECH TRANSMISSION SYSTEM WITH SPEECH ANALYSIS-SYNTHESIS

Ken-ichi Noda, Tokyo, and Shuzo Saito, Tama, both of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Oct. 7, 1975, Ser. No. 620,384
Claims priority, application Japan, Oct. 16, 1974, 49-119599
Int. Cl.² G10L *1/00*; H04J *3/00*
U.S. Cl. 179—1 SA **11 Claims**



1. A multiplex speech transmission system comprising a transmitting apparatus and a receiving apparatus, said transmitting apparatus including means for multiplexing respective speech signals of a plurality of speech channels constituting at least two groups thereof by subjecting said speech signals to pulse code modulation, speech analyzing means for extracting a feature parameter signal including a partial autocorrelation coefficient and an excitation source signal from each of said multiplexed pulse code modulation speech signals, time division multiplexing means for further multiplexing said extracted feature parameters from the signals of one of said groups with the feature parameters from the signal of at least one other of said groups, and means for transmitting said further multiplexed feature parameter signal over a transmission line; and said receiving apparatus including means for separating said received further mutliplexed feature parameter signals into said at least two respective groups, means responsive to said separated feature parameter signals for restoring the speech signals that have been multiplexed by time division control and means for distributing the restored signals among respective

speech channels thereby producing speech signals in respective speech channels.

4,052,564

MASKING SOUND GENERATOR

Robert L. Propst, Ann Arbor, and Michael A. Wodka, Ypsilanti, both of Mich., assignors to Herman Miller, Inc., Zeeland, Mich.

Filed Sept. 19, 1975, Ser. No. 614,917
Int. Cl.² H04K 1/00
U.S. Cl. 179—1.5 M **9 Claims**

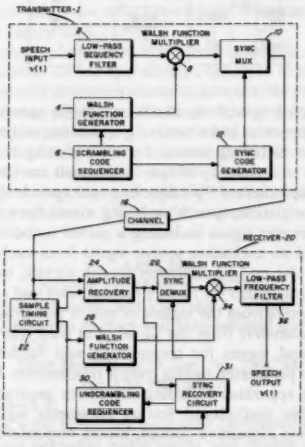
1. In combination with a room having a ceiling and being adapted for use by adult persons of average height, sound generating apparatus for producing sound signals which mask other sounds present in said room, said apparatus comprising a hollow enclosure having a top opening and a side opening through which sound signals are emitted, a speaker mounted in said enclosure intermediate said top opening and said side opening, said speaker being positioned to face outwardly from said enclosure through said top opening, circuit means disposed in said hollow enclosure for developing an electrical signal that is converted to an audible sound signal emitted by said speaker, said apparatus being positioned at a height intermediate the head of a standing adult person and the ceiling so that said top opening faces in an upwardly direction.

4,052,565

WALSH FUNCTION SIGNAL SCRAMBLER

Denmer Dix Baxter, Orlando, Fla., and Charles Michael Reeves, Dalton, Mass., assignors to Martin Marietta Corporation, Orlando, Fla.

Filed May 28, 1975, Ser. No. 581,695
Int. Cl.² H04K 1/00
U.S. Cl. 179—1.5 S **19 Claims**



1. An information signal scrambler comprising:

a. means for sampling an analog information signal to develop a series of amplitude samples of the information signal,

b. means for generating a plurality of Walsh function signals

c. sequencer means for causing the said means for generating a plurality of Walsh function signals to periodically and cyclically change the generated Walsh function signal, and

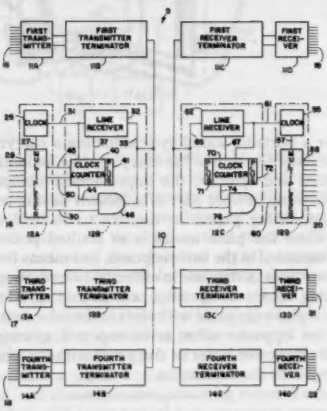
d. means for multiplying the said samples with each of the generated Walsh function signals.

4,052,566

MULTIPLEXER TRANSMITTER TERMINATOR

William Allan MacKay, Richmond Hill, Canada, assignor to D.D.I. Communications, Inc.

Filed Dec. 24, 1975, Ser. No. 644,101
The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.
Int. Cl.² H04J 3/04
U.S. Cl. 179—15 A **17 Claims**



1. A device for a multiplexer unit in a system having a plurality of multiplexer units each being connected on a common communication line wherein each multiplexer unit has an operating period relative to a multiplexer time clock, comprising in combination:

a counter circuit having an input connected to the multiplexer time clock for providing a counter output upon registering a preselected clock count which corresponds to the time period of the multiplexer unit;

a line receiver connected to the communication line for providing a line receiver output upon detecting a predetermined period of signal absence on the communication line;

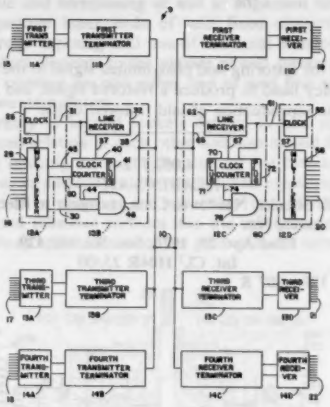
means connecting said line receiver output to said counter circuit for resetting said counter circuit after said period of signal absence on the communication line;

and means connecting said counter circuit output of the multiplexer unit to transfer information through the communication line only at the time period of the multiplexer unit.

4,052,567
MULTIPLEXER RECEIVER TERMINATOR

William Allan MacKay, Richmond Hill, Canada, assignor to D.D.I. Communications, Inc.

Filed Dec. 24, 1975, Ser. No. 644,102
The portion of the term of this patent subsequent to Oct. 4, 1994, has been disclaimed.
Int. Cl.[2] H04J *3/08*
U.S. Cl. 179—15 AL 14 Claims



1. A device for a multiplexer receiver in a system having a plurality of multiplexer receivers connected on a common communication line wherein each multiplexer receiver has a time period for reception relative to a multiplexer time clock, comprising in combination:

a counter circuit connected to the multiplexer time clock for providing a counter output upon registering a clock count between two preselected clock counts which correspond to the time period of the multiplexer receiver;

a line receiver connected to the communication line for providing a line receiver output upon detecting a predetermined period of signal absence on the communication line;

means connecting said line receiver output to said counter circuit for resetting said counter circuit after said predetermined period of signal absence;

and means connecting said counter circuit output to the multiplexer receiver for enabling reception from the communication line only during a counter output of said counter circuit.

4,052,568
DIGITAL VOICE SWITCH

Joseph Albin Jankowski, Bethesda, Md., assignor to Communications Satellite Corporation, Washington, D.C.

Filed Apr. 23, 1976, Ser. No. 679,588
Int. Cl.[2] G10L *1/04*
U.S. Cl. 179—15 AS 5 Claims

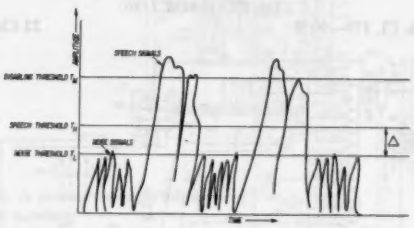
1. A digital voice switch for detecting speech signals in the presence of noise signals on a communication channel, where the signal in said channel is periodically sampled and encoded, comprising:

a. threshold adjustment means having sources of speech threshold signals and noise threshold signals and means for adjusting said speech and noise threshold signals;

b. speech detector means connected to receive said encoded signal samples and said speech threshold signal from said threshold adjustment means for comparing the magnitude of said samples with said speech threshold signal and for providing an output signal when said speech signals are determined to be present in said communication channel;

c. noise detector means connected to receive said encoded signal samples and said noise threaded signal from said threshold adjustment means for comparing the magnitude of said samples with said noise threshold signal and for providing an output signal developed from comparison of the magnitude of said encoded signal with said noise threshold signal indicating the level of said noise signals in said communications channel;

d. logic means connected to receive said output signal from said noise detector means and having a first state and a second state for applying command output signals to said threshold adjustment means when said logic means is in the first state and for not applying said command signals when said logic means is in the second state, said logic means being in the first state when the level of said noise signals exceeds a predetermined noise level or is less than a second predetermined noise level, and said command



output signals causing said threshold adjustment means to adjust the values of said speech and noise threshold signals according to the level of said noise signals;

e. a source of a disabling threshold signal;

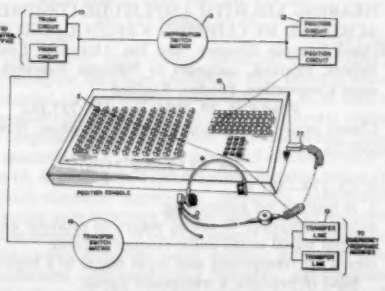
f. disabling detector means connected to receive said encoded signal samples and said disabling threshold signal from said source for providing an output signal when said encoded signal sample exceeds said disabling threshold signal; and

g. disabling circuit means connected to receive said output from said disabling detector means and said output signal from said speech detector means for triggering said logic means to the second state when said sample exceeds said disabling threshold signal and when said output signal from said speech detector means indicates the presence of speech signals in said communication channel.

4,052,569
EMERGENCY CALL ANSWERING SYSTEM

Robert M. Pirnie, III, Montgomery, Ala., assignor to Communication Equipment & Contracting Co., Inc., Union Springs, Ala.

Filed July 9, 1976, Ser. No. 701,551
Int. Cl.[2] H04M *3/50*
U.S. Cl. 179—27 FH 1 Claim



1. In an emergency call answering system having a plurality

of incoming trunk circuits connected through a distribution switch matrix to a plurality of answering position circuits:

the improvement comprising a position console selectively connectable to a line transfer circuit through a selectable switch connectable to the answering position circuit and through a transfer line and transfer switch matrix to a selected emergency response agency, said single switch establishing a signal and audio circuit through said switch matrices from the incoming trunk circuit to said transfer line circuit to select and ring on a line to an emergency response agency so that upon answer by an emergency response agency it is connected directly to the incoming trunk circuit initiating the call and to the console operator.

4,052,570

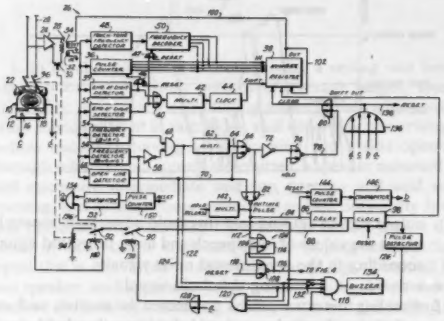
TELEPHONE SYSTEM

Paul J. Sutton, 300 Central Park West, New York, N.Y. 10024

Filed Dec. 22, 1975, Ser. No. 643,322

Int. Cl.[2] H04M *1/50*

U.S. Cl. 179—90 B **22 Claims**



1. An attachment for a telephone set which dials telephone numbers onto a telephone line, or the like, said attachment comprising:

a. storing means coupled to said telephone set for storing a telephone number at the same time as it is initially dialed and transmitted onto the telephone line;

b. signal detector means coupled to said telephone set for detecting the receiving of a busy signal in response to the initial dialing of said telephone number and in the absence thereof clearing said storing means; and

c. control means coupled to said signal detector means; and responding to the receipt of a busy signal and the releasing of the telephone line for causing the number stored to be re-dialed onto the telephone line, said control means comprising release means coupled to the telephone set for terminating the operation of said control means and clearing said storing means when the handset is subsequently removed from the cradle of the telephone set.

4,052,571

HEARING AID WITH AMPLITUDE COMPRESSION ACHIEVED BY CLIPPING A MODULATED SIGNAL

Richard Langton Gregory, and Ian Alexander Low, both of Bristol, England, assignors to National Research Development Corporation, London, England

Filed Oct. 29, 1976, Ser. No. 737,162

Claims priority, application United Kingdom, Nov. 7, 1975, 46190/75

Int. Cl.[2] H04R *25/00*

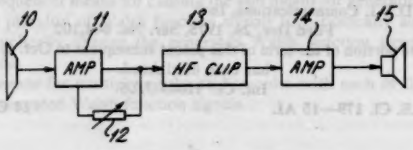
U.S. Cl. 179—107 R **10 Claims**

1. A hearing aid comprising:

means responsive to sound waves to produce an electrical input signal in the audio-frequency band;

means for transposing said input signal to a high-frequency band to produce a transposed signal;

limiting means for limiting the peak amplitude of said transposed signal to a predetermined value to produce a peak-limited signal;



means for restoring said peak-limited signal to the audio-frequency band to produce a restored signal; and means for audio reproduction of said restored signal.

4,052,572

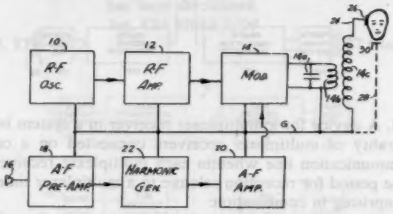
HEARING AID

Curtiss R. Schafer, Newtown, Conn., assignor to Electro-Physical Research, Inc.

Filed Apr. 29, 1976, Ser. No. 681,429

Int. Cl.[2] H04R *25/00*

U.S. Cl. 179—107 R **10 Claims**



7. The method of enabling a person to effect cortical sensing and recognition of a variety of sounds including speech and music, including the steps of providing an electrical signal having a spectrum of audio frequencies, providing a carrier-frequency signal, modulating the carrier-frequency signal with said electrical signal, impressing the output of the modulator on an electrode coupled to the person's head so as to effect cortical sensing of the spectrum of audio frequencies, said method including the step of imposing harmonic distortion of at least 5% on said electrical signal.

4,052,573

ROTARY OR SLIDE TYPE SWITCH ASSEMBLY HAVING RECESSED PRINTED CIRCUIT SUBSTRATE, INTERPOSED RESILIENT BRIDGING CONTACT AND MOVABLE PRINTED CIRCUIT DISC

Tatsuo Kojima, Kyoto, and Yoshio Kawai, Kawasaki, both of Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed Feb. 11, 1976, Ser. No. 657,059

Claims priority, application Japan, Feb. 17, 1975, 50-20024; Nov. 28, 1975, 50-161921[U]; Nov. 28, 1975, 50-161922[U]; Nov. 28, 1975, 50-161923[U]

Int. Cl.[2] H01H *19/08, 15/04, 9/00*

U.S. Cl. 200—11 DA **9 Claims**

1. An electrical switch assembly which comprises in combination:

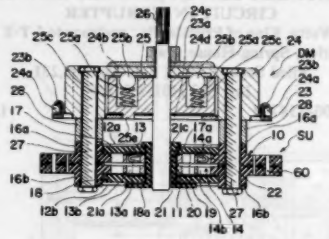
a substantially plate-like substrate made of electrically insulating material and having first and second surfaces opposed to each other;

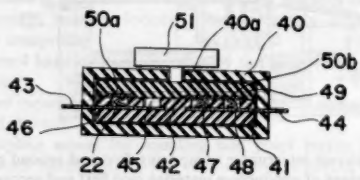
a plurality of elongated, fixed contact elements made of electrically conductive material and embedded in said substrate in spaced relation to each other with a plane of

each of said fixed contact elements lying substantially intermediately of the thickness of said substrate, each of said fixed contact elements having an outer end extending outwardly from a periphery of said substrate for external electrical connection;

at least one first socket defined in said substrate and opening on either one of said first and second substrate surfaces, said first socket extending from the opening on said either one of the first and second substrate surfaces into the substrate substantially halfway the thickness of said substrate and terminating at and in alignment with one of respective inner ends of said fixed contact elements thereby exposing said one of the inner ends of the fixed contact elements to the outside of said substrate through the opening on said either one of said first and second substrate surfaces;

a plurality of second sockets defined in said substrate in spaced relation to each other and also to said first socket and opening on said either one of the first and second substrate surfaces, said second sockets extending from the respective openings on said either one of the first and second substrate surfaces into the substrate substantially halfway the thickness of the substrate and terminating at





and in alignment with associated portions ajacent the inner ends of the remaining fixed contact elements thereby exposing the portions adjacent the inner ends of the remaining fixed contact elements to the outside of the substrate through the respective openings on either one of the first and second substrate surfaces;

removable intermediate contact pieces made of electrically conductive material, one of said intermediate contact pieces being removably accommodated within the first socket and additional contact pieces being removably accommodated within substantially all of the second sockets;

at least one movable contact element movably supported on said either one of said first and second substrate surfaces;

means carrying said movable contact element for positioning said movable contact element to any one of a plurality of switching positions; and

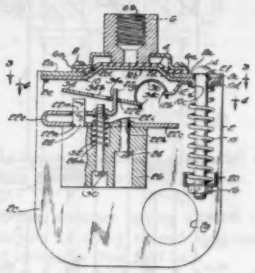
said movable contact element being so shaped that, depending upon the position of said movable contact element, said one of said respective inner ends of the fixed contact element is electrically connected to any one of said portions adjacent the inner ends of some or all of the fixed contact elements through said movable contact element by means of said contact piece within said first socket via the additional contact pieces within substantially all of the second sockets.

4,052,574

PRESSURE SWITCH WITH SNAP-TOGGLE ADJUSTING MEANS

Harry W. Brown, Big Bend, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed June 17, 1976, Ser. No. 697,210
Int. Cl.² H01H 35/34
U.S. Cl. 200—83 P **8 Claims**



1. A pressure switch comprising:

a housing;

pressure responsive means mounted to said housing for movement relative thereto in response to pressure;

actuator means mounted in said housing and movable by said pressure responsive means;

a bearing movably mounted in said housing;

a lever pivotally mounted between its ends at said bearing;

contact means mounted in said housing for actuation by one end of said lever in response to pivoting thereof;

a toggle spring biased between said actuator means and the other end of said lever to cause snap-action pivoting of said lever as said toggle spring passes through an overcenter force-reversing toggle point in response to movement of said actuator means; and

adjusting means for moving said bearing relative to said actuator means, thereby varying the toggle point of said toggle spring relative to movement of said actuator means whereby to adjustably control the pressure at which said contact means is actuated.

4,052,575

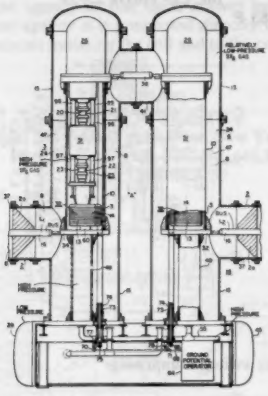
METAL-CLAD GAS-TYPE HIGH-POWER CIRCUIT-BREAKER CONSTRUCTIONS INVOLVING TWO ARC-EXTINGUISHING ASSEMBLAGES

Richard E. Kane, Monroeville, Pa.; Frank L. Reese, deceased, late of Monroeville, Pa., by Blanche C. Reese, executrix, **Lansford, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

Filed May 6, 1975, Ser. No. 575,103
Int. Cl.² H01H 33/28
U.S. Cl. 200—145 **13 Claims**

1. A high-power, high-voltage metalclad compressed-gas circuit-interruptor structure including two laterally-spaced-apart metalclad circuit-breaker assemblages (**3, 4**), at least one circuit-breaker unit (**8,** or **9**) having a pair of separable contacts (**23, 25**) disposed interiorly within each metalclad circuit-breaker assemblage (**3, 4**), each metalclad circuit-breaker assemblage (**3, 4**) having an outer-disposed metallic casing (**15**), an interiorly-disposed supporting insulating high-pressure gas-containing tube structure (**49**) at least partially supporting each circuit-breaker unit (**8** or **9**) in spaced radial inward fixed relationship away from the outer metallic grounded casing (**15**), pressurized interconnecting metallic gas-conducting means (**41**) disposed adjacent one end of the two laterally-

spaced-apart metalclad circuit-breaker assemblages (3, 4) and pneumatically interconnecting the gas spaces therein (24) about the circuit-breaker units (8 or 9), an electrical connection (38) disposed centrally within said interconnecting metallic gas-conduit means (41) and electrically interconnecting said circuit-breaker assemblages (3, 4) in electrical series relationship for interrupting high-voltage circuits, a presurrized terminal (16) within a metalclad casing structure (2) connecting to each metalclad circuit-breaker assemblage (3, 4) adjacent the mid-portion thereof, a high voltage power conductor in each



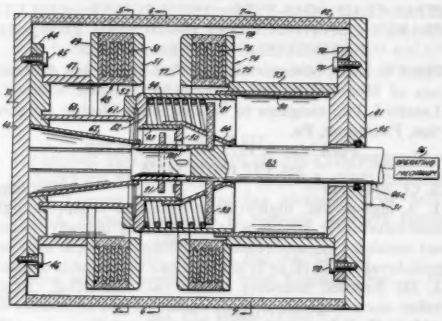
said latter-mentioned pressurized terminal metalclad casing structure (2), a grounded metallic supporting frame structure for at least partially supporting said circuit-breaker assemblages (3, 4), at least one gas-reservoir tank also at least supported by said metallic frame structure for storing arc-extinguishing gas, and operating means at high voltage disposed adjacent said one end of the two-laterally-spaced-apart circuit-breaker assemblages (3, 4) comprising two high-voltage operators (26) for simultaneously actuating the two circuit-breaker assemblages (3, 4) in their opening and closing movements.

4,052,576

CONTACT STRUCTURE FOR SF_6 ARC SPINNER

Robert Kirkland Smith, Ambler, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Sept. 2, 1975, Ser. No. 609,559
Int. Cl.[2] H01H *33/18*
U.S. Cl. 200—147 R **17 Claims**



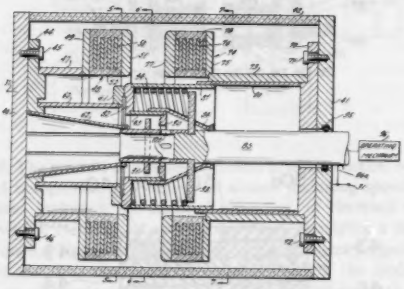
1. A circuit interrupter comprising an elongated cylindrical housing filled with dielectric gas at a single pressure, first and second cooperable conductive rings operable to define an arcing gap between their opposing surfaces and composed of high conductivity material, and an electrical winding closely magnetically coupled to said first conductive ring; said first conductive ring defining a short-circuited turn; said electrical winding being operable with said first conductive ring to produce a magnetic field which is out of phase with the arc current to be interrupted by said circuit interrupter for rapidly spinning an arc around said arcing gap even near instantaneous current zero, first and second terminals fixed to said circuit interrupter; said first terminal, said winding, said first conductive ring, said second conductive ring and said second terminal being connected in electrical series; said first and second conductive rings and said winding being coaxial with the axis of said cylindrical housing; first and second interrupter contacts connected to said first and second terminals respectively and relatively movable parallel to the said axis of said cylindrical housing between an open and a closed position; said first conductive ring and said electrical winding having internal diameters; said first and second interrupter contacts being concentrically disposed within the interior of said internal diameters of said first conductive ring and said electrical winding; said first and second interrupter contacts engaging in a region axially aligned with said arcing gap.

4,052,577

MAGNETICALLY DRIVEN RING ARC RUNNER FOR CIRCUIT INTERRUPTER

Gerald A. Votta, King of Prussia, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Sept. 2, 1975, Ser. No. 609,231
Int. Cl.[2] H01H *33/18*
U.S. Cl. 200—147 R **15 Claims**



1. A circuit interrupter comprising first and second parallel coaxial rings of conductive material; said first and second rings having first respective confronting surfaces which are operable to define an arcing gap; at least said first ring comprising a high conductivity short-circuited turn; an electrical winding having a given number of turns disposed coaxially with said first and second rings and being positioned adjacent a surface of said first ring which is opposite to its said first surface; first and second electrical terminals for said circuit interrupter respectively connected to one end of said electrical winding and to said second ring; the other end of said electrical winding being connected to said first ring; first and second cooperable contacts connected to said first and second terminals, respectively, whereby, after said first and second contacts open, an arc is produced in said arcing gap between said first and second rings, and said arc between said first and second rings is rapidly rotated around said gap; and a sealed housing filled with a static dielectric gas under pressure greater than atmospheric pressure for housing said circuit interrupter; said gap between said first and second rings being at least large enough to withstand the maximum voltage to be applied across said gap after said arc is extinguished; said first and second rings being relatively massive, thereby to serve as good heat sinks to the localized heat generated by the arc therebetween; said electrical winding being closely magnetically coupled to said first ring whereby, when arc current flows in series with said winding, a

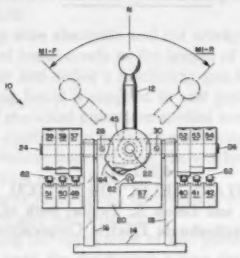
high current is induced in said ring, thereby to produce a magnetic field which is phase-shifted from the arc current, thereby to cause rapid rotation of said arc in said gap, even at low instantaneous current; said first ring and said winding being rigidly immersed in a potted insulation ring, thereby to be rigidly supported against electrodynamic forces of repulsion between said closely spaced first ring and winding.

4,052,578

MULTIPLE CAM, MULTIPLE POSITION SWITCH CONTROL MECHANISM WITH JOY-STICK TYPE OPERATOR OPERABLE IN X-Y PLANES

William A. Hoke, 517 Overdale Road, Baltimore, Md. 21229

Filed Jan. 6, 1976, Ser. No. 649,685
Int. Cl.² H01H *3/32, 25/04;* G05G *9/00*
U.S. Cl. 200—153 L **3 Claims**



1. A control mechanism for controlling a plurality of multiple-operation motive devices either separately or simultaneously comprising:

a control handle means operable by the user of said mechanism;

a pivot means connected to the control handle means at one end thereof;

a coupling means for coupling said pivot means to said control handle means, said coupling means having a channel provided therein;

a housing means, said coupling means being disposed interiorly of said housing means, said housing means having a slot provided in a surface thereof for receiving said control handle means therethrough and further having at least two pairs of aligned apertures in other surfaces thereof;

shaft means pivotally connected to said pivot means, said shaft means including at least one shaft unit which is received within said channel in said coupling means and positioned within one pair of said aligned apertures in said housing, said shaft means further including aligned separate shaft elements received and fixedly held within the other of said pair of aligned apertures of said housing, said shaft elements being pivotally mounted in said pivot means;

camming means fixed to portions of the ends of each of said shaft elements and said one shaft unit; and

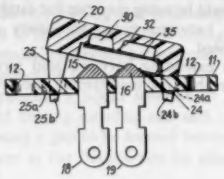
switch means interfaced with said motive device, movement of said control handle means in a plane perpendicular to said aligned longitudinal axes of said shaft elements and one of said shaft unit causing said shaft elements to rotate about their longitudinal axes and thereby to rotate at least certain of said camming means into contact with at least certain of said switch means.

4,052,579

MOMENTARY CONTACT SWITCH HAVING PIVOTING ACTUATOR MOUNTED ON SWITCH BASE

Ronald H. Arthur, Fort Lauderdale, Fla., assignor to AMF Incorporated, White Plains, N.J.

Filed Mar. 15, 1976, Ser. No. 667,244
Int. Cl.² H01H *3/12*
U.S. Cl. 200—159 A **10 Claims**



1. A momentary contact switch for selectively establishing electrical connection between stationary contacts, said switch comprising

a thin insulator base member having aligned on one face thereof a plurality of dome shaped stationary contacts which extend upwardly from said face,

a first pair of notches or voids extending through said base member beyond one end of said aligned stationary contacts and a second pair of notches or voids extending through said base member beyond the other end of said aligned stationary contacts, the notches of each pair being on opposite sides of the aligned contacts,

an elongated actuator of insulating material extending transversely across said stationary contacts and extending longitudinally beyond both ends of the aligned stationary contacts,

said actuator including four downwardly extending yieldable legs each located to be inserted through a respective one of said notches or voids,

a barb element on the bottom portion of each leg for engaging the underside of said base member and thereby releasably holding said legs within said notches or voids,

a spring contact member formed of elongated, yieldable, conductive material and having a reverse bend intermediate its ends to form first and second legs,

the first leg of the spring contact member having a pocket formed therein which is generally complementary in shape to a dome shaped contact for receiving therein an end one of the aligned stationary contacts,

said actuator having a recess in its underside to receive and position the second leg of the spring contact member therein,

the reverse bend of the spring contact member being located longitudinally beyond said end one of the aligned stationary contacts.

4,052,580

MOMENTARY CONTACT PUSHBUTTON TYPE SWITCH HAVING FLEXIBLE, MOUNTED HOUSING

Ronald J. Stanish, Hollywood, Fla., assignor to AMF Incorporated, White Plains, N.Y.

Continuation-in-part of Ser. No. 583,466, June 3, 1975, Pat. No. 3,983,341. This application Sept. 24, 1976, Ser. No. 726,095
Int. Cl.² H01H *13/52*
U.S. Cl. 200—159 R **12 Claims**

1. A momentary contact push switch comprising

a thin insulator terminal board having two end regions and an intermediate region therebetween,

a plurality of stationary contacts on one surface of the terminal board in said intermediate region,

terminal means for said stationary contacts,

a housing member formed as a unitary plastic piece having a top portion that extends transversely across the intermedi-

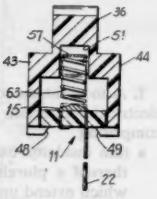
ate region of the terminal board and including yieldable side skirts that extend downwardly below opposite side edges of the intermediate region of the terminal board,

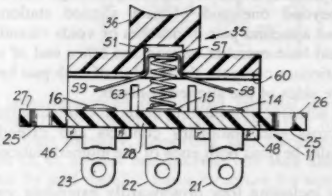
one or more barbs or latch elements at the lower portions of the skirts,

said barbs extending inwardly of the side edges of the intermediate region for releasably engaging the underside of the terminal board,

a bridging contact disposed against the underside of the top portion of said housing member for establishing electrical connection between given stationary contacts on the terminal board,

spring means extending between said terminal board and housing member for maintaining the top portion of the





housing member raised above the terminal board and for maintaining the bridging contact above and out of contact with the stationary contacts,

said barbs on the skirts holding the housing member on the terminal board and limiting the separation of the top portion of the housing member above the terminal board,

the top portion of said housing member and said bridging contact being movable toward said terminal board upon application of a force thereto that is directed substantially normal to the surface of the terminal board,

all of said barbs becoming disengaged from the underside of the intermediate region of the terminal board and said bridging contact engaging said given stationary contacts after a given distance of motion of the housing member toward the terminal board.

4,052,581

SWITCH WITH MOVABLE AND FIXED CONTACTS

Shigeru Matsui, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Oct. 28, 1975, Ser. No. 626,557

Claims priority, application Japan, Oct. 29, 1974, 49-130655[U]

Int. Cl.² H01H *50/56*

U.S. Cl. 200—283 **14 Claims**

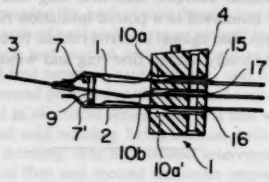
1. A switch comprising:

at least one springy fixed contact member having a free end;

a springy movable contact member having a free end and capable of being moved by application of force to its free end into and out of contact with said fixed member;

a supporting member supporting said fixed and movable members with the free end of said movable member extending beyond the free end of said fixed member; and

a positioning means fixed to said supporting member and disposed between said free ends of said fixed and movable members and said supporting member for positioning said



fixed and movable members for movement into and out of contact.

4,052,582

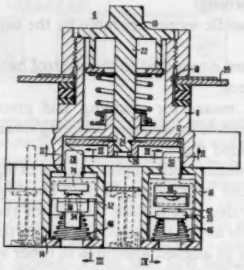
ROTARY SELECTOR SWITCH

John H. Mullen, and Glenn R. Taylor, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 8, 1976, Ser. No. 665,139

Int. Cl.² H01H *3/42*

U.S. Cl. 200—330 **7 Claims**

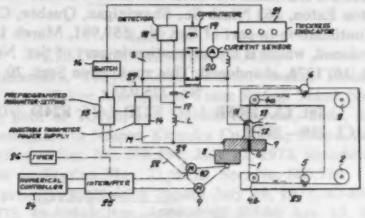


1. A rotary selector switch comprising a rotatable actuating unit and two switch structures, a housing, the rotatable unit in the housing and comprising a rotatable selector mechanism, said mechanism comprising a detachably mounted cam, means limiting rotation of the cam to about 180°, each switch structure having a reciprocable contact operating member to effect opening and closing of a circuit through the switch structure, the mechanism and the cam having mutually inter-fitting means to enable removal and repositioning of the cam in an alternate mode of operation with respect to the contact operating members, the cam having camoperating surface means for actuating the contact operating members and comprising a number of operating positions for the operating members including in sequence two adjacent up positions, two adjacent down positions, a single down position, and a single up position.

4,052,583
METHOD OF AND APPARATUS FOR ELECTRICAL-DISCHARGE MACHINING WITH A TRAVELING-WIRE ELECTRODE

Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Inc., Yokohamashi, Japan

Filed June 23, 1976, Ser. No. 699,206
Claims priority, application Japan, June 24, 1975, 50-78825
Int. Cl.[2] B23P *1/08*
U.S. Cl. 219—69 W 11 Claims



1. In a method of electrically machining a conductive workpiece in which:
- a traveling-wire electrode and the workpiece are relatively displaced transversely to the length of the traveling-wire electrode and define a machining gap between them,
- a machining liquid is supplied to said gap, and
- a series of electrical pulses are applied across the workpiece and the electrode to generate machining discharges in the gap to remove material from the workpiece, the improvement which comprises:
- a. temporarily interrupting said relative displacement of said electrode and said workpiece;
- b. continuing the application of said pulses during the interruption until the discharges across the gap substantially cease; and
- c. when said discharges across the gap substantially cease, measuring the leakage current across said gap for at least one further applied pulse, said leakage current providing an indication of workpiece thickness.

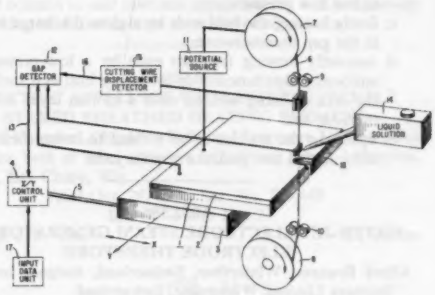
9. In an apparatus for the electrical machining of a conductive workpiece including:
- a traveling-wire electrode,
- means for relatively displacing said traveling-wire electrode and a workpiece in accordance with a predetermined program while maintaining a machining gap therebetween,
- means for supplying a machining liquid to said gap, and
- means for applying electrical pulses across said workpiece and said electrode to effect material-removal machining discharges across said gap, the improvement which comprises:
- a. means for temporarily halting said relative displacement while permitting continued application of said pulses; and
- b. means effective to the substantial termination of said discharges for measuring leakage current across said gap upon application of at least one further electrical pulse, the magnitude of said leakage current being an indication of the thickness of said workpiece.

4,052,584
METHOD AND APPARATUS FOR CUTTING INSULATING MATERIAL

Kurt Reznicek, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 29, 1976, Ser. No. 681,754
Int. Cl.[2] B23P *1/08*
U.S. Cl. 219—69 M 11 Claims

1. Apparatus for cutting insulating material comprising:
- a base for supporting the insulating material, said material having a conductive layer proximate to the surface thereof;
- displacement-control means coupled to the base for selectively moving said base;
- a cutting member adapted to be positioned against said insulating material in contacting relationship therewith in a direction substantially perpendicular to said base;
- means for moving said cutting member along said direction thereby abrasively cutting said insulating material;
- means adapted to be connected to a voltage source for imposing a potential difference between said cutting member and said conductive layer;
- means for supplying a liquid solution at the cutting site between said cutting member and said conductive layer thereby causing a gap to be formed between said member and said layer at the cutting site by electro-erosion machining;
- means for generating control signals in response to distance variations of said gap between said cutting member and said conductive layer at the cutting site for controlling said displacement means; and



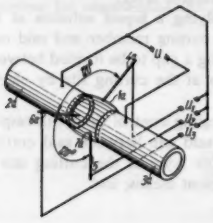
means for detecting tensions on said cutting member for controlling said generating means.

6. Method for cutting insulating material comprising the steps of:
- coating a surface of the insulating material with a conductive layer;
- mounting said insulating material on a base coupled to displacement means;
- positioning a cutting member against said insulating material in contacting relationship therewith in a direction substantially perpendicular to the base;
- imposing a potential difference between the cutting member and the conductive layer;
- moving the cutting member along said direction thereby abrasively cutting said insulating material;
- supplying a liquid solution at the cutting site between the cutting member and the conductive layer thereby causing a gap to be formed between said member and said layer at the cutting site by electro-erosion machining; and
- monitoring said cutting member deviations proximate the cutting site during said moving step for controlling said displacement means.

4,052,585
BUTT WELDING PROCESS AND APPARATUS FOR EFFECTING SAME

Vitaly Alexandrovich Sidyakin, ulitsa Fabritsiusa, 44, korpus 2, kv. 126; Alexandr Nikolaevich Sabantsev, ulitsa Bagritskogo, 3, korpus 1, kv. 70; Evgeny Mikhailovich Lapin, Davydkovskaya ulitsa, 38, kv. 57, and Evgeny Alexeevich Machnev, Presnensky val, 7, kv. 2, all of Moscow, U.S.S.R.

Filed Aug. 11, 1975, Ser. No. 603,254
Int. Cl.² B23K *11/04*
U.S. Cl. 219—100 9 Claims

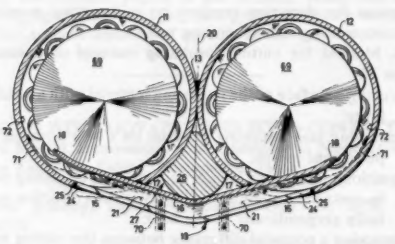


1. A butt welding process comprising the steps of:
a. positioning the butt ends or portions of the articles to be welded in proximate spaced relation to each other;
b. placing said butt ends in a shielding medium at a predetermined low pressure;
c. firstly heating the butt ends by a glow discharge initiated in the gap therebetween;
d. secondly heating the butt ends by a low-pressure arc uniformly distributed over the entire butt end surfaces of the articles being welded until a molten layer is formed thereon; and
e. upsetting the articles to be welded to cause their plastic deformation and produce a weld joint.

4,052,586
WATER-JET ELECTRODE STEAM GENERATOR AND ELECTRODE THEREFORE

Alfred Brunner, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Nov. 21, 1975, Ser. No. 634,059
Claims priority, application Switzerland, Nov. 26, 1974, 15656/74
Int. Cl.² H05B *3/60;* F22B *1/30*
U.S. Cl. 219—284 11 Claims

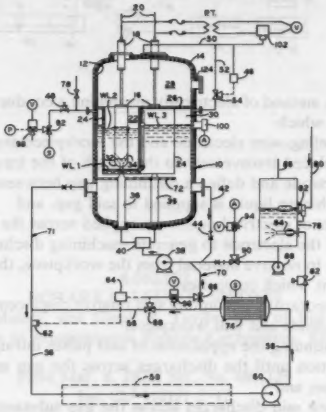


1. An electrode for a water-jet electrode steam generator comprising
a water-collecting box including at least one vertically disposed cylindrical tube having a vapor outlet in upper portion, a water outlet at a bottom thereof and a slot in a wall thereof for passage of a flow of water into said tube; and
each said tube having a deflecting plate extending through said slot and disposed to deflect a flow of water impinging thereon into said tube and tangentially of said wall, said plate being mounted in sealed relation to one side of said slot and disposed to pass between the center of said tube and the opposite side of said slot to form a free opening, said plate having a free end located within said tube downstream of the flow of water.

4,052,587
HTW HEATING SYSTEM HAVING AN ELECTRODE STEAM BOILER AS THE DIRECT SOURCE OF HTW

Milton Eaton, 363 Ninth St., Shawinigan, Quebec, Canada

Continuation-in-part of Ser. No. 559,981, March 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 505,995, Sept. 16, 1974, abandoned. This application Sept. 20, 1976, Ser. No. 725,033
Int. Cl.² H05B *3/60;* F22B *1/16;* F24D *3/02*
U.S. Cl. 219—295 11 Claims



1. In an HTW space heating system in which the direct source of HTW is an automatic electrode steam boiler including a pressure vessel having at least one steam generating compartment surrounded by a control compartment, at least one electrode in said vessel and adapted to be connected in an electrical distribution system, said at least one electrode being positioned in a corresponding at least one steam generating compartment surrounded by a control compartment, a corresponding at least one water spout in said vessel for directing water toward the tip of said at least one electrode and said boiler including means for maintaining a predetermined minimum HTW level in said vessel, the improvement in said HTW heating system including:
a. means providing for limited steam output for the at least one steam generating compartment of said boiler, such limited steam output being utilized for control purposes by control means associated with said boiler;
b. means, including a boiler water pump, for mixing HTW water taken from the boiler with water from an outside source and pumping the mixed water through said at least one water spout with sufficient velocity for the water to flow up the surface of said at least one electrode to the water level in said at least one steam generating compartment;
c. a heated spaces circuit having pumping means for continuously circulating HTW through said heated spaces circuit;
d. an HTW supply circuit connecting said boiler with said heated spaces circuit and providing for unrestricted flow of HTW from said boiler to said heated spaces circuit so that said boiler serves as a pressurized expansion tank for said heating system;
e. said boiler water pump having an inlet connected to the HTW in said boiler and an outlet connected to said at least

one water spout, a diversion circuit connecting said heated spaces circuit with said boiler water pump inlet; and

f. control means responsive to a condition associated with the heated spaces for selectively diverting a controlled amount of HTW from said heated spaces circuit through said diversion circuit to said boiler water pump inlet; such diverted HTW constituting water from an outside source, and the HTW diverted from said heated spaces circuit being replaced with HTW from said boiler through said HTW supply circuit.

4,052,588
ELECTRIC HEATER PANEL

Tatsuji Nakamura, Tokyo; Kenji Fukuda, Asaka; Toshihiko Tsuji, Tokyo; Takeo Maruyama, Yono; Ryouji Sakai; Shohei Sawada, both of Tokyo, and Haruki Miyoshi, Toda, all of Japan, assignors to Nippon Kinzoku Co., Ltd., Tokyo, Japan

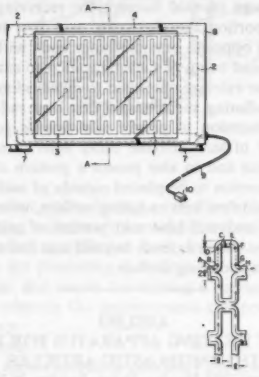
Continuation of Ser. No. 378,654, July 12, 1973, abandoned.

This application Mar. 21, 1975, Ser. No. 560,710

Claims priority, application Japan, July 29, 1972, 47-89480; Apr. 4, 1973, 48-40845; Apr. 4, 1973, 48-40846; Apr. 13, 1973, 48-44424

Int. Cl.[2] H05B *1/00, 3/22;* **F24D** *13/00;* **H01C** *3/17*

U.S. Cl. 219—345 **2 Claims**



1. A panel heater comprising: a flat metal sheet of substantially even thickness of form 0.06 to 0.2 mm; having electrode terminals at two opposite ends of said sheet and a mesh-like radiation section formed in the central portion of said sheet, said mesh-like radiation section being composed of a plurality of units of wave-like current passageways, each unit having a uniform width of approximately 2mm from one end to the other, said units being arranged parallel to each other and connected to each other at the crests of said wave-like current passageways so that the combined width of said passageways at said crests is twice said uniform width; a pair of heat resistant boards between which said metal sheet is sandwiched; and a frame assembly joining together said heat resistant boards.

4,052,589
HEATED FOOD SERVICE SYSTEM

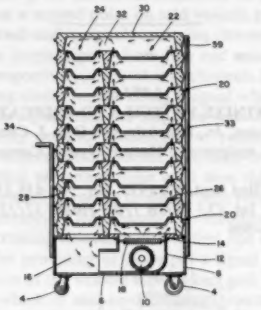
William B. Wyatt, Nashville, Tenn., assignor to Aladdin Industries, Incorporated, Chicago, Ill.

Continuation-in-part of Ser. No. 508,091, Sept. 23, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,286

Int. Cl.[2] F27D *11/02*

U.S. Cl. 219—400 **11 Claims**

1. A food service system comprising a closed base structure having an inlet and an outlet provided therein, means to change the air temperature from the ambient means in said base structure for supplying forced air other than at ambient temperature through said outlet, a stack of matched separable trays each having compartments thermally insulated from each other disposed on top of said base structure, one compartment in each tray positioned over a corresponding compartment in a tray below to form a first column of compartments, another compartment in each tray positioned over a corresponding compartment in a tray below to form a second column of



compartments, said trays disposed on said base structure with said first column positioned over said outlet and said second positioned over said inlet, openings around said compartments in said first and second columns permitting air to flow upward in said first column from said outlet and downward in said second column to said inlet and means having a closed passage connecting said first column to said second column.

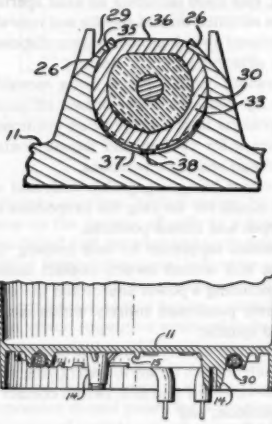
4,052,590
ELECTRIC APPLIANCE WITH INTERMITTENTLY STAKED SHEATHED HEATING ELEMENT

Richard F. Anderl, Chippewa Falls, and Lawrence J. Tienor, Eau Claire, both of Wis., assignors to National Presto Industries, Inc., Eau Claire, Wis.

Filed Oct. 28, 1976, Ser. No. 736,449

Int. Cl.[2] F27D *11/02*

U.S. Cl. 219—438 **13 Claims**



1. An electrically heated appliance having a heat-conductive metal wall containing a channel and a sheathed electric heater element intermittently staked in said channel, the sheath of said electric heater element having longitudinally spaced indentations in the material of its outer side into which correspondingly spaced segments of the outer edge of the opposed channel sides are pressed, intervening portions of said outer edges

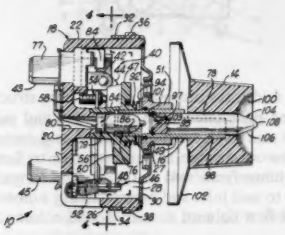
betwen said pressed segments being out of engagement with the heater element sheath, the material of the heater element sheath between said indentations closely engaging about and conforming to the side edges of said pressed segments thereby confining linear growth of the sheathed heater element in the channel during heating.

4,052,591

INFINITE SWITCH AND INDICATOR

George F. Sekera, Jr., Hinsdale, and Otto J. Cousins, Burbank, both of Ill., assignors to Harper-Wyman Company, Hinsdale, Ill.

Filed Sept. 19, 1975, Ser. No. 615,119
Int. Cl.² H05B *1/02*; H01H *37/12*
U.S. Cl. 219—506 **5 Claims**



1. An infinite switch for controlling the temperature of a stove heating element comprising

a housing,

a cover on said housing having an aperture,

a hollow, rotatable spindle positioned within said housing and extending through said aperture,

said spindle being movable between an off position and a range of on positions,

a knob mounted on said spindle and the exterior of said housing, said knob including an axial aperture,

cam means mounted on said spindle and rotatable therewith,

first and second switch contact means disposed within said housing adjacent said cam means,

said first switch contact means being movable to an open position by said cam means in said off position and to a closed position in said range of on positions,

thermal means for cycling said second contact means between closed and open positions,

said cam means being engageable with said second switch contact means for varying the proportion of cycling between open and closed positions,

terminal means supported by said housing for connecting said first and second switch contact means in a series circuit including a power source and the heating element,

a light source positioned entirely within said housing adjacent said spindle,

circuit means electrically connecting said light source to said first switch contact means for energizing said light source upon movement of said first switch contact means to said closed position, and

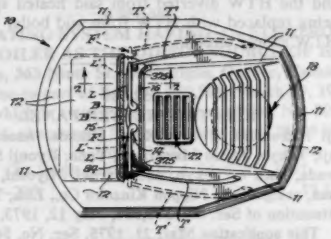
light transmission means positioned within said spindle adjacent said light source and extending along said spindle and through said aperture in said knob, said light transmission means including a translucent member having a first, conical shaped end with sides of a preselected angle, said first end extending outside of said knob for transmitting light from said light source along at least a portion of said spindle within said housing to the exterior of said housing.

4,052,592

DEVICE FOR HEATING THERMOPLASTIC EYEGLASS FRAMES

Edward A. Ebert, 203 Huxley Drive, Snyder, N.Y. 14226

Filed Nov. 19, 1976, Ser. No. 743,286
Int. Cl.² H05B *3/06*
U.S. Cl. 219—521 **4 Claims**



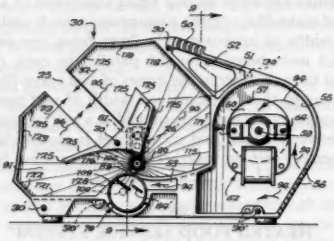
1. A radiant type heater for heating an opthalmic frame having a frontal lens holding portion and a temple portion comprising a housing, electrical heating means and heat transfer means for transferring heat to first and second opposed heat radiating surfaces on said housing for receiving said frontal lens holding portion therebetween, said first heat radiating surface having opposite extreme outer ends with at least one extreme outer end being of a configuration to extend radiation beyond said one extreme outer end to meet radiation from said second heat radiating surface, said first heat radiating surface being of a dimension to permit said temple portions to be placed outside of said extreme outer ends of said first heat radiating surface and to also permit a portion of said frontal lens holding portion to be placed outside of said one extreme outer end of said first heat radiating surface, whereby said one extreme outer end will heat said portion of said frontal lens holding portion which extends beyond said one extreme outer end of said first radiating surface.

4,052,593

ELECTRIC HEATING APPARATUS FOR HEATING THERMOPLASTIC ARTICLES

Edward A. Ebert, 203 Huxley Drive, Snyder, N.Y. 14226

Filed June 23, 1975, Ser. No. 589,200
Int. Cl.² H05B *1/00*; G02B *5/10*
U.S. Cl. 219—521 **16 Claims**



1. A device for heating an article, comprising a housing, article receiving means positioned relative to said housing for positioning an article to be heated in said housing, infrared generator means in said housing providing a source of infrared heating energy and guide means in said housing for conducting said heating energy to said receiving means, said guide means dividing said housing into a heating chamber in which the article to be heated is positioned by said receiving means and an interior chamber, said generator means being located in said

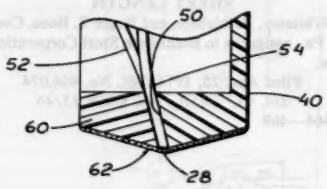
heating chamber, said housing having means including air moving means to pressurize said interior chamber, said guide means having a window at said generator means opening into said interior chamber to allow a flow of air through said window from said interior chamber into said heating chamber toward said generator means and to said article receiving means, said interior chamber at said window including a radiant energy responsive thermal control connected in controlling relationship with said infrared generator means and arranged to vary the energy output of said generator means in response to absorption of radiant heat from said generator means through said window and loss of said heat through said air flow through said window past said thermal control.

4,052,594

MARK READER WITH IMPROVED MARK SENSING HEADS

Loren Roger Davis, South Pasadena, Calif., assignor to Bourns, Inc., Riverside, Calif.

Filed Mar. 29, 1976, Ser. No. 671,897
Int. Cl.[2] G06K *7/14, 7/08;* G11B *5/12*
U.S. Cl. 235—61.11 E **18 Claims**



1. In a document reader having a radiation source, a sensing head for directing radiation from said source onto a document and sensing radiation reflected back from the document, a readout means for producing a readout corresponding to the sensed radiation, and means for driving a document past said sensing head, wherein the improvement comprises a sensing head comprising:

a body portion,

transmitting means lodged in said body portion for transmitting radiation from said source onto a passing document,

receiving means lodged in said body portion for receiving radiation reflected by a document and direction said radiation to said readout means, and

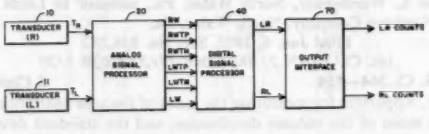
a substantially transparent, ultra high molecular weight polyethylene film secured to said body portion and overlying said transmitting and receiving means to separate a document being read from said body portion by substantially the film thickness.

4,052,595

AUTOMATIC VEHICLE MONITORING SYSTEM

David P. Erdmann, Hopkins, and Dennis L. Kurschner, Minnetonka, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed June 18, 1976, Ser. No. 697,610
Int. Cl.[2] G08G *1/065*
U.S. Cl. 235—92 TC **8 Claims**



1. An apparatus for detecting the direction and the number of vehicles passing by a predetermined point along a vehicle path, said apparatus comprising:

first and second magnetic sensors positioned in a spaced relationship, the first of said sensors being oriented for maximum sensitivity ot magnetic disturbance at a first point on said vehicle path and the second of said sensors being oriented for maximum sensitivity to magnetic disturbance at a second point on said vehicle path;

first and second analog signal processing channels connected to receive output signals from first and second magnetic sensors, respectively, each of said channels including,

differentiating means for providing a signal which is a derivative of the signal from the magnetic sensor, and

a zero-crossing detector connected to receive the signal from said differentiating means, said zero-crossing detector providing an output pulse each time the signal from said differentiating means crosses a zero reference level;

direction determining logic means for receiving signals from the zero-crossing detectors of said first and second channels and for providing at its output a signal indicative of the direction of the vehicle travel along said path depending upon which of said zero-crossing detectors produces the first output signal, and;

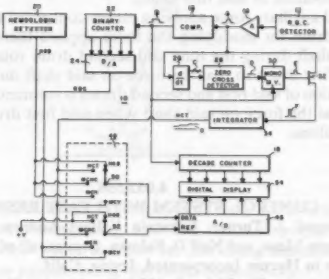
vehicle counting logic means for receiving the signal from the differentiating means of said first channel and providing an output indicative of the number of vehicles passing along said vehicle path past said predetermined point.

4,052,596

AUTOMATIC HEMATOLOGY ANALYZER

Howard Andrew Vick, Pearland, Tex., assignor to Hycel, Inc., Houston, Tex.

Filed Dec. 23, 1974, Ser. No. 535,495
Int. Cl.[2] H03K *21/04*
U.S. Cl. 235—92 PC **6 Claims**

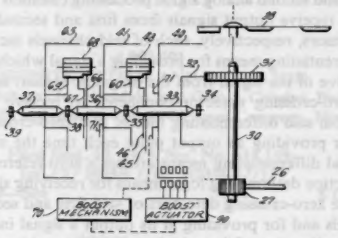


1. In a hematology analyzer having means for producing pulses in response to the passage of cells in a blood dilution sample through a blood cell detector and including means for providing an analog hemoglobin signal indicative of hemoglobin content of the sample, the improvement comprising: an analog to digital conversion means having a data input and a reference input to which respective analog signals are applied and further having an output at which a digital output signal is provided indicative of a value equal to a value of an input to said data input divided by a value of an input to said reference input; means responsive to said pulses for providing an analog count signal indicative of a red blood cell count for the sample; means coupled to receive said pulses for generating an analog hematocrit signal indicative of the hematocrit of said sample; and connecting means for connecting said analog hematocrit signal to the data input of said conversion means and for connecting said analog count signal to the reference input of said conversion means, whereby said digital output signal is provided indicative of mean corpuscular volume of said sample for connection to utilization means.

4,052,597
CONSTANT TORQUE MULTIPLE DRUM COUNTER

James W. Angus, Nashua, N.H., assignor to Sun Chemical Corporation, New York, N.Y.

Filed July 9, 1976, Ser. No. 704,044
Int. Cl.[2] G06M 1/18; G01L 7/12
U.S. Cl. 235—92 C 8 Claims

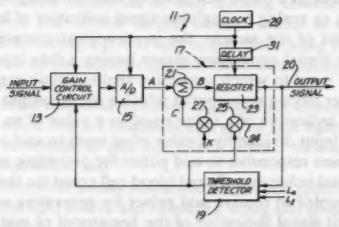


1. An indicating instrument comprising, in combination:
aneroid capsule transducer means for converting a measured parameter into rotational motion:
a shaft connected to said transducer means and rotated thereby;
a first rotatable counter drum connected to said shaft; said first counter drum moving at the same angular rate as said shaft and indicating the measure of said measured parameter within a first given portion of the total range of said measured parameter;
a second counter drum for indicating multiples of said first given portion of the total range of said measured parameter and drive coupling means connecting said first and second drums, whereby said first and second drums rotate together for only a relatively short portion of the total rotation of said first drum;
and auxiliary force applying means connected to said second drum for modifying the force applied thereto from said shaft during the time said second drum rotates with said first drum so that the force on said shaft during the rotation of said first and second drums is substantially the same as the force on said shaft when said first drum is rotating alone.

4,052,598
CONTROL SYSTEM WITH FAST RESPONSE

Raymond J. Turner, Fountain Valley; Andrew M. Kameya, Costa Mesa, and Naif D. Salman, Orange, all of Calif., assignors to Hycom Incorporated, Irvine, Calif.

Filed May 3, 1976, Ser. No. 682,734
Int. Cl.[2] G06F 15/46
U.S. Cl. 364—113 18 Claims

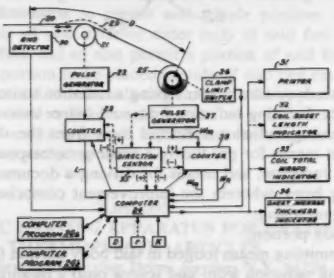


1. A control system comprising:
first signal processing means for processing an input signal in accordance with a first program to provide a first signal, said first program having at least one variable;
second signal processing means for processing the first signal in accordance with a second program to provide an output signal which is related to the first signal and the second program whereby a change in said variable of said first signal will provide a predictable change in the output signal;
means responsive to a particular condition for changing said variable of said first program;
means responsive to said particular condition for changing the output signal in a way to bring about at least a portion of said predictable change in the output signal more rapidly than could be brought about solely by said first signal; and
said means for changing said variable including threshold detector means responsive to a predetermined characteristic of the output signal being outside of a particular range of values for providing a correction signal to the first signal processing means and means responsive to the correction signal for changing said variable of said first program.

4,052,599
METHOD AND APPARATUS FOR DETERMINING COIL SHEET LENGTH

Roger L. Whiteley, Bethlehem, and Roger T. Boos, Coopersburg, both of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Apr. 25, 1974, Ser. No. 464,074
Int. Cl.[2] G01B 7/04; G06F 15/46
U.S. Cl. 364—469 13 Claims



1. A computer method of determining the coil length of sheet material movingin contact with a length measuring roll and subsequently coiled on a coiler mandrel, which comprises:
a. generating a sheet length measuring signal at said roll which includes slippage errors when slippage occurs between said sheet material and said roll,
b. generating a coil wrap signal at said coiler mandrel,
c. computing a slippage-error compensated sheet length measuring signal, and
d. computing the integral of the compensated sheet length measuring signal between limits represented by the coil wrap signal to determine coil sheet length.

4,052,600
MEASUREMENT OF STATISTICAL PARAMETERS OF A DISTRIBUTION OF SUSPENDED PARTICLES

Alan L. Wertheimer, North Wales, Pa., assignor to Leeds & Northrup Company, North Wales, Pa.

Filed Jan. 6, 1975, Ser. No. 538,382
Int. Cl.[2] G01N 21/00; G06F 15/20; G02B 5/20
U.S. Cl. 364—554 5 Claims

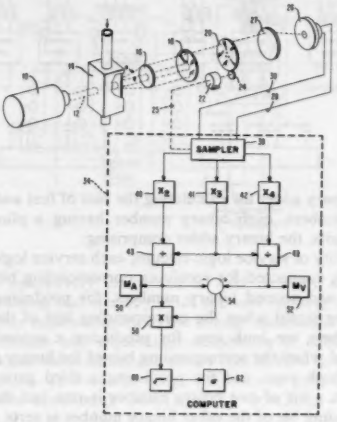
1. Apparatus for measuring the mean of the area distribution, the mean of the volume distribution, and the standard deviation of the area distribution of a collection of particles comprising:

means for passing a light beam through said collection of particles,

means for filtering the light diffracted from said beam through a first filter which transmits light flux diffracted from each particle proportional to the second power of its radius,

means for filtering the light diffracted from said beam through a second filter which transmits light flux diffracted from each particle proportional to the third power of its radius,

means for filtering the light diffracted from said beam through a third filter which transmits light flux diffracted from each particle proportional to the fourth power of its radius,



means for producing a first, second and third signal (X_2, X_3 and X_4, respectively) in response to the integral of the light flux detected passing through the respective first, second and third filters due to all of the particles of said collection,

means for calculating the mean of the area distribution (M_A) of the particles in said collection as a number proportional to the ratio X_3/X_2,

means for calculating the mean of the volume distribution (M_v) of the particles in said collection as a number proportional to the ratio X_4/X_3, and

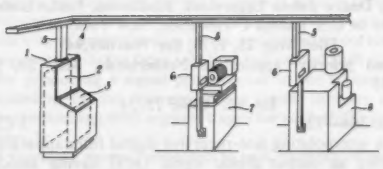
means for calculating the standard deviation of the area distribution of the particles in said collection as the square root of the product $M_A(m_v - M_A)$.

4,052,601

CONTROL SYSTEMS FOR MACHINES AND PLANTS GENERALLY, PARTICULARLY DESCRIBED FOR APPLICATIONS ON MACHINE TOOLS

Vittorio Corni, Modena, Italy, assignor to Comau Industriale S.p.A., Turin, Italy

Filed Mar. 11, 1975, Ser. No. 557,377
Claims priority, application Italy, Mar. 18, 1974, 67834/74
Int. Cl.² G05B *19/02*
U.S. Cl. 364—104 **6 Claims**



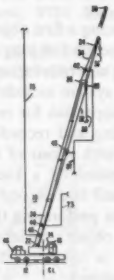
1. A control system for a plurality of machine work stations of the type where each machine station performs one or more operations on a workpiece comprising a central unit for controlling the plurality of machine work stations, a plurality of local control units coupled to and actuated by said central unit, each of said local control units controlling one or more machine work stations, each of said local control units comprising a step-by-step programmer operatively associated with one or more machine work stations and generating a sequential series of control signals, each of said local control units further including a hard-wired logic unit tailored to a particular one or more machine work stations to produce step-by-step a preselected sequence of machine signals in response to said sequential series of control signals, and interface means coupling said machine signals to the one or more machine work stations with which said particular step-by-step programmer is operatively associated.

4,052,602

LOAD AND RADIUS INDICATING SYSTEM

Robert Horn, Richardson, and Raymond J. Slovacek, Dallas, both of Tex., assignors to Forney Engineering Company, Addison, Tex.

Filed Aug. 14, 1975, Ser. No. 604,523
Int. Cl.² G08B *21/00*; G06F *15/20*
U.S. Cl. 364—424 **5 Claims**



1. A load and radius indicating system for a variable boom length type crane comprising: load and radius displays, each mounted for view by an operator for providing indication of load and radius parameters of the crane respectively;

sensors including a line load tensiometer transducer, boom angle transducer and boom length transducer which are responsively coupled to the crane for producing respective analog outputs representative of load, boom angle and boom length;

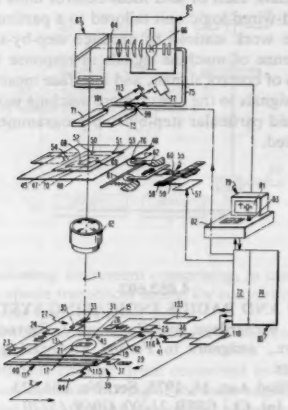
control circuit means responsively coupled to each of said transducers for delivering control outputs for driving said displays, said control circuit including memory means programmable with data based on the configuration of the crane in use for delivering selected memory outputs, with said control circuits means being responsive to said memory outputs and said transducer outputs for generating said control outputs in accordance with the particular operating configuration of the crane as the load, boom angle and boom length are varied, and also including boom length comparator means having a set of inputs corresponding to a selected operating range of boom length test inputs responsive to the boom length signal with said comparators producing an operating range output when the boom length signal corresponds to the set input for the particular operating range of the crane.

4,052,603

OBJECT POSITIONING PROCESS AND APPARATUS

Karl Karlson, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,905
Int. Cl.[2] G06F *15/46*; H05K *13/00*
U.S. Cl. 364—120 30 Claims



1. In a process for placing a first object into rotational alignment with respect to a second object, said process employing a system for supporting and moving said objects with respect to one another, which system includes alignment optics and position measurement apparatus for recording position information and for measuring and recording distances, said first object being provided with a pair of spaced apart alignment marks which are separated by a known distance which is stored in said system, and said second object being provided with a mark, said system performing the steps of:

a. moving the second object translationally until the mark on the second object is optically aligned with one of the marks on the first object;

b. moving the second object translationally until the mark on the second object is optically aligned with the second mark on the first object while generating and counting electrical signals which measure the distance of travel of the second object in X and Y orthogonal directions and recording the counts in X and Y directions representing the new position of the second object;

c. determining the distance between the marks on the first object from the recorded counts representing the translational movement in X and Y which was required to bring the marks on the second object from alignment with the first mark on the first object into alignment with the second mark on the first object;

d. comparing the determined distance between the marks on the first object with the known distance in order to verify the accuracy of the alignments;

e. determining the rotational position of the objects from the counts representing the measured translational movement, in the X and Y directions, which was required to bring the mark on the second object from the alignment with the first mark on the first object to alignment with the second mark on the first object from alignments according to steps a and b where the mark separation distances agree within a predetermined limit, and;

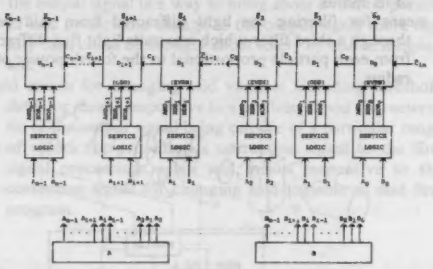
f. changing the relative position of the objects to bring them into rotational alignment.

4,052,604

BINARY ADDER

David Steven Maitland, and Billy E. Thayer, both of Loveland, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 19, 1976, Ser. No. 650,211
Int. Cl.[2] G06F *7/50*
U.S. Cl. 364—786 3 Claims



1. A binary adder for calculating the sum of first and second binary numbers, each binary number having a plurality of binary digits, the binary adder comprising:

a plurality of service logic circuits, each service logic circuit being connected for receiving corresponding bits of the first and second binary numbers, for producing a first gating signal when the corresponding bits of the binary numbers are both one, for producing a second gating signal when the corresponding bits of the binary numbers are both zero, and for producing a third gating signal when a bit of one binary number is one and the corresponding bit of the other binary number is zero;

a plurality of summing circuits, each summing circuit being connected for receiving the first, second, and third gating signals from a corresponding one of the plurality of service logic circuits, for receiving an input carry signal, for producing a sum bit output signal equal to the logical value of the input carry signal in response to either the first or second gating signal, and for producing a sum bit output signal equal to the logical complement of the input carry signal in response to the third gating signal; and

a plurality of carry circuits, each carry circuit being connected for receiving the first, second, and third gating signals from the corresponding service logic circuit, for receiving the input carry signal, for producing a carry bit output signal representing logical one in response to the first gating signal, for producing a carry bit output signal representing logical zero in response to the second gating signal, and for producing a carry bit output signal equal to the logical value of the input carry signal in response to the third gating signal;

the plurality of service logic, carry, and summing circuits being connected so that the carry bit output signal of a selected carry circuit serves as the input carry signal for both the succeeding more significant carry circuit and the corresponding more significant summing circuit.

4,052,605

INTERPOLATING NON-RECURSIVE DIGITAL FILTER

Ludwig Desire Johan Eggermont, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

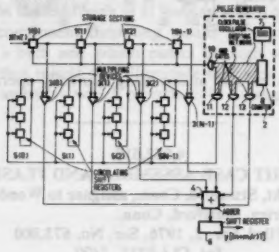
Filed May 25, 1976, Ser. No. 689,947
Claims priority, application Netherlands, May 29, 1975, 7506333
Int. Cl.[2] G06F *15/34*
U.S. Cl. 364—724 3 Claims

1. An interpolating non-recursive digital filter apparatus for producing an output digital signal $\{y(i)\}$ having associated therewith a predetermined output sampling rate r/T, in response to a digital input signal $\{x(n)\}$ having associated there-

with an input sampling rate 1/T, whereby i, $n = 0, \pm 1, \pm 2, \ldots$ and whereby r is a positive integer, said non-recursive digital filter apparatus having associated therewith rN predetermined impulse response values $a(j)$, N being a positive integer and $j = 0, 1, 2, 3, \ldots rN$, said apparatus comprising:

storage means for receiving and storing N successive input signal samples $x(n), x(n-1), x(n-2), \ldots x(n-N+1)$;

memory means having r addressable memory fields M_m, whereby $m = 0, 1, 2, 3, \ldots r-1$, each memory field M_m having N addressable memory locations for storing impulse response value differences $b(m,k) = a(m+kr) - a[(m-1)+kr]$ wherein $k = 0, 1, 2, 3, \ldots N-1$;



means operatively connected to said memory means for addressing said memory fields and said memory locations;

multiplier means coupled to the storage means and the memory means and sequentially responsive to each impulse response value difference subset $b(m,0)$, $b(m,1)$, $b(m,2), \ldots b(m,N-1)$ over the range $0 \leqq m < r$ to produce signal subsets $b(m,0)x(n)$, $b(m,1)x(n-1)$, $b(m,2)x(n-2)$, $\ldots$ $b(m,N-1)x(n-N+1)$;

accumulator means for combining the products in the signal subsets to form the output signal sample

$$y(rn+m) = \sum_{q=0}^{m} \sum_{k=0}^{N-1} b(q,k)x(n-k);$$

means for applying the signal subsets from said multiplier means to said accumulator; and

means for resetting the accumulator means once every input sampling period T.

4,052,606

CHARGE TRANSFER DEVICE TRANSVERSAL FILTERS

Lawrence Griffith Heller, Brewster, and James Merrill White, Mahopac, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 25, 1976, Ser. No. 699,908
Int. Cl.² G06G 7/16; H03K 5/159
U.S. Cl. 364—825 **10 Claims**

1. A charge transfer device transversal filter structure comprising a first charge transfer shift register responsive to a first sampled analog signal,

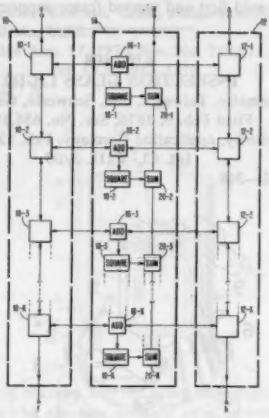
a second charge transfer shift register responsive to a second sampled analog signal,

said first and second shift registers including

a plurality of stages through which said sampled analog signals are discretely shifted to provide relative translation between said first and second sampled analog signals,

a plurality of multiplication means connected to corresponding pairs of stages from said first and second shift registers for producing a signal proportional to the square of the additions of the discrete analog signal samples in said corresponding shift register stages for each shifting operation,

and summing means connected to said plurality of multiplication means for summing signals proportional to the squares of the additions of said discrete analog signal samples for each shifting operation to produce a resultant output signal proportional to the addition of the squares of the additions of said translated analog signal samples



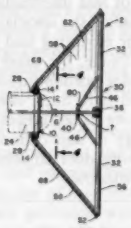
wherein said resultant output signal is a convolution or correlation function of said first and second analog signals.

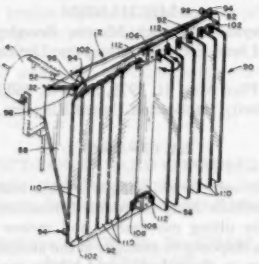
4,052,607

VERSATILE LIGHT DIFFUSER

Raymond George Larson, 9731 Rainier Circle, Huntington Beach, Calif. 92646

Filed Aug. 26, 1976, Ser. No. 718,057
Int. Cl.² G03B 15/02
U.S. Cl. 362—18 **45 Claims**





20. A photographic light diffuser and director comprising the combination: a first frame support member adapted for releasable rigid attachment to a photographic light source; a second frame support member supportively secured in spaced relationship to said first frame support member; a conformable light diffusing and directing member supported from said first

and second frame support members and defining a light chamber having side walls of selectable disassociatable nature, and means to releasably retain said light diffusing and directing member on said first and second frame support members.

4,052,608

INSPECTION GLASS LIGHT

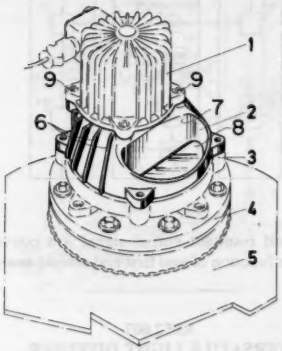
Horst Papenmeier, Talweg 2, 584, Schwerte, Germany

Filed Feb. 9, 1976, Ser. No. 656,197

Claims priority, application Germany, Feb. 13, 1975, 2506084

Int. Cl.[2] F21L *1/00*

U.S. Cl. 362—368 **6 Claims**



1. A combination inspection glass light assembly for simultaneous illumination and observation, adapted to be mounted on an inspection glass flange of an observation chamber, comprising: an intermediate housing including side-by-side ducts through said housing from one end to the other end, one duct constituting a light duct and the other duct constituting a viewing duct, one end of said intermediate housing having a mounting flange surrounding the associated ends of both ducts and providing means for mounting said intermediate housing on an inspection glass flange, the other end of said housing having a connecting flange portion surrounding only the associated other end of said light duct; lamp means including a housing having a mounting flange; means connecting said lamp housing mounting flange to said connecting flange; and the other end of said viewing duct adjacent said lamp housing constituting a viewing window.

4,052,609

MOTOR VEHICLE WITH HEADLAMP TILTING MECHANISM

Frederick Raymond Patrick Martin, Bromley, England, assignor to Lucas Electrical Company Limited, Birmingham, England

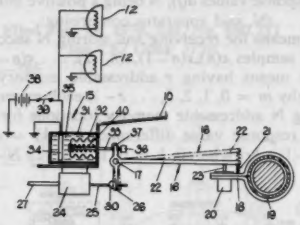
Filed Mar. 21, 1975, Ser. No. 560,879

Claims priority, application United Kingdom, Mar. 30, 1974, 14218/74

Int. Cl.[2] B60Q *1/10*

U.S. Cl. 362—71 **4 Claims**

1. A motor vehicle including a vehicle body, wheels upon which said vehicle body is mounted, headlamps mounted on said body for tilting movement, and means for tilting said headlamps in response to changes in the attitude of the vehicle body relative to the wheels, said tilting means including a sensor device having a lever pivotally mounted on a sprung part of the motor vehicle and engaging a member mounted on an unsprung part of the motor vehicle, said tilting means also including a transmission for transmitting movements of said lever to said headlamps, continuously so that changes in the attitude of the vehicle body relative to the wheels are transmitted continuously to said headlamps by said transmission, and means connected directly to said lever and disposed, when operated, to move said lever out of engagement with said member whereby said tilting means can be rendered inoperative when desired, said means being manually operable from a remote location.



4,052,610

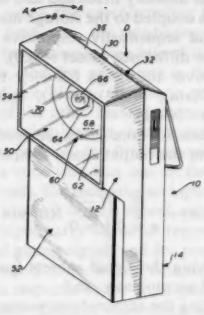
FLASHLIGHT CASE ASSEMBLY AND FLASHLIGHT

Mark Sternlicht, Stamford, Conn., assignor to Wonder Corporation of America, Stamford, Conn.

Filed Apr. 2, 1976, Ser. No. 673,000

Int. Cl.[2] F21L *7/00*

U.S. Cl. 362—200 **13 Claims**



1. A flashlight case assembly comprising:

a. a first body assembly of first predetermined configuration;

b. a second body assembly of second predetermined configuration;

c. said first predetermined configuration and said second predetermined configuration, of said first and said second body assemblies respectively, being such that when said first body assembly is disposed adjacent said second body assembly a component cavity of predetermined configuration is formed therebetween;

d. connecting means interconnecting said first body assembly and said second body assembly for relative movement with respect to each other to establish either a closed condition or an open condition therefore;

e. detent means carried by said first body assembly and said secured body assembly to retain same in said closed condition;

f. aperture means extending through a predetermined surface of said first body assembly;

g. reflector means disposed in said component cavity in alignment with said aperture means;

h. component mounting means disposed in said component cavity in alignment with said reflector means and formed to mount a light bulb for coaction with said reflector means so that when illuminated light from the light bulb coacts with a reflector surface formed on said reflector means to direct a beam of light of predetermined color through said aperture means;

i. said component mounting means further carrying electrical conductor means for coaction with an on/off switch means also carried by said component mounting means, for coaction with a bulb when mounted on said component mounting means, and for coaction with a dry cell battery when disposed in said component cavity to provide power means for illuminating the light bulb;

j. said component mounting means being formed of material which permits the passage of light therethrough and mounting the light bulb so that light emitted thereby can pass through said component mounting means; and

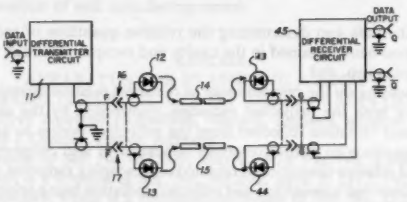
k. said second body assembly being formed from material of a predetermined color and which also permits the passage of light therethrough in at least an area thereof proximate said component mounting means so that light emitted from a bulb and which passes through said component mounting means will illuminate said area of said second body assembly which permits light to pass therethrough.

4,052,611

HIGH SPEED FIBER OPTIC COMMUNICATION LINK

Franklin H. Fish, Indianapolis, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 22, 1975, Ser. No. 570,927
Int. Cl.[2] H04B 9/00
U.S. Cl. 250—199 **8 Claims**



1. A high speed fiber optic communication link comprising,

a differential transmitter circuit having first and second output terminals and having a single input terminal for receiving digital data and having logic means for providing output digital data on said first and second output terminals representing logic "one" and logic "zero" electrical signals, said output data representing a logic "one" signal being an output signal level on said first output terminal only and said output data representing a logic "zero" signal being an output signal level on said second output terminal only,

first and second electro-optic devices connected with said first and second output terminals, respectively, for converting said logic "one" and logic "zero" electrical signals to light signals,

first and second optical waveguides for transmitting said light signals to another location,

first and second photo-detectors at said another location connected with said first and second optical waveguides for converting said light signals to electrical signals, and

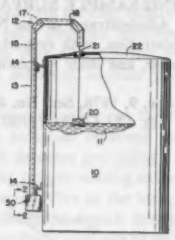
a differential receiver circuit having first and second inputs connected one each with the outputs of said first and second photo-detectors for amplifying and combining said converted electrical signals into digital data corresponding to the digital data applied to the differential transmitter circuit.

4,052,612

ANALOG-TO-DIGITAL ENCODER UNIT EMPLOYING A PRE-ENCODED FILM WITH IMPROVED FILM TENSIONING MEANS

Kenneth A. Larkin, Modesto, Calif., assignor to E. & J. Gallo Winery, Modesto, Calif.

Filed Aug. 17, 1976, Ser. No. 715,071
Int. Cl.[2] H01J 3/14
U.S. Cl. 250—237 R **20 Claims**



1. In an optical encoder unit for generating digital electrical signals defining the absolute position of a movable member from a rotatable shaft coupled to said movable member, said optical encoder unit comprising a support member; first and second film reels rotatably secured to said support member; motion translating means for transferring motion between said reels; guide means secured to said support member; a radiation detection station mounted adjacent said guide means, said station including a radiation source for generating a plurality of spaced radiation beams and a radiation detector assembly having a plurality of radiation sensitive means each associated to a different one of said beams for generating said electrical signals; a pre-encoded film strip received by said reels and guided by said guide means past said detection station, said film strip having a plurality of laterally spaced, longitudinally extending coded tracks, each arranged to occupy the radiation path between said source and a different one of said plurality of radiation sensitive means; a non-slip film drive means engageable with said film strip and having an input shaft adapted to be coupled to said rotatable shaft; and means for maintaining tension in said film strip as said strip is translated past said detection station from reel-to-reel in response to rotation of said film drive means; the improvement wherein said motion translating means comprises first and second hub means each rotatably secured to said support member for rotation about the axis of a different one of said first and second film reels, respectively, and each provided with a toothed peripheral portion for mutual driving engagement in an interference region; and

wherein said tension maintaining means comprises first and second spring members each coupled between a different one of said first and second film reels and said first and second hub means for providing intercoupling therebetween.

4,052,613

LOG-INJECT-LOG IN SAND CONSOLIDATION

Robert P. Murphy, and James W. Spurlock, both of Tulsa, Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 8, 1976, Ser. No. 675,045
Int. Cl.[2] G01V 5/00
U.S. Cl. 250—259 **6 Claims**

1. A method for detecting the effect of a sand consolidation operation in a hydrocarbon formation penetrated by a well such that additional plastic injections can be used if required, said method comprising:

a. logging an earth formation with a pulsed neutron log;

b. injecting a plastic material together with a tracer having a

thermal neutron cross section substantially higher than that of the earth formation;

c. at least partially setting the plastic with the tracer therein; and

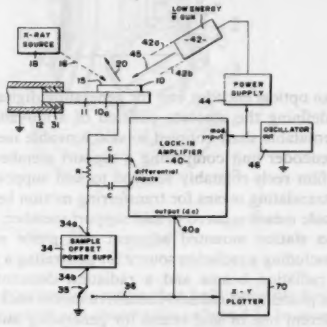
d. repeating the pulsed neutron log, whereby the logs can be compared to determine if additional plastic injection is required.

4,052,614

PHOTOELECTRON SPECTROMETER WITH MEANS FOR STABILIZING SAMPLE SURFACE POTENTIAL

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Frank J. Grunthaner, and Blair F. Lewis, both of Pasadena, Calif.

Filed Apr. 9, 1976, Ser. No. 675,351
Int. Cl.² G01M *23/00*
U.S. Cl. 250—310 **16 Claims**



1. In a spectrometer system of the photoelectron spectroscopy for chemical analysis type in which the surface characteristics of a sample in said spectrometer are analyzed as a function of electrons ejected from said sample surface due to energy absorbed by said sample surface from a selected source, the spectrometer including circuitry operated by potentials referenced to a potential reference, definable as system common, to which the spectrometer structure is converted, the improvement comprising:

support means for supporting thereon a sample whose surface is to be analyzed;

electrical insulating means mechanically coupling said support means to said spectrometer structure and for permanently electrically insulating said support means from said system common through said spectrometer structure;

energy means for directing energy to the sample surface to cause electrons to be ejected therefrom;

a modulated power source means for providing a potential with respect to said system common, which is variable at a preselected modulating frequency;

electron source means powered by said power source for directing low energy electrons to said sample surface; and

circuit means for determining the amplitude of an AC current produced through said sample as a function of the electrons from said electron source means absorbed by the sample surface and for offsetting the surface potential of said sample so that said AC current is at a peak amplitude.

4,052,615

SPHERICAL CAVITY METHOD AND APPARATUS FOR MEASURING A SHEET MATERIAL PROPERTY USING INFRARED RADIATION

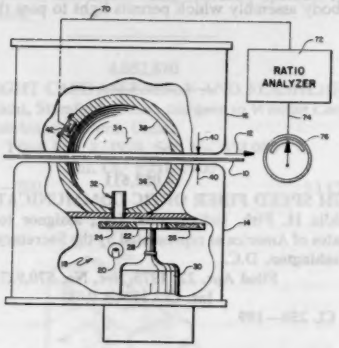
Boong Youn Cho, Columbus, Ohio, assignor to Industrial Nucleonics Corporation, Columbus, Ohio

Filed July 30, 1976, Ser. No. 710,026
Int. Cl.² G01N *21/30*
U.S. Cl. 250—341 **14 Claims**

1. The method of measuring a property such as moisture content in a sheet of material such as paper that both absorbs and strongly scatters infrared radiation, comprising the steps of

passing the sheet through the central region of a substantially spherical cavity formed between a pair of concave mirror-surfaced, specularly reflecting bodies that are spaced apart to form a pass gap of sufficient width to allow substantially free movement of the sheet therethrough while substantially enclosing a first portion of the sheet on both sides,

projecting onto one side of the sheet in the center of the cavity a spot of infrared radiation to illuminate a second portion of the sheet included within and substantially smaller than the enclosed first portion so that infrared radiation scattered or transmitted by the second portion will be reflected from the mirror-surfaced bodies and directed back to the second portion substantially within the area of the sheet defined by the spot, the relative sizes of the first and second portions in relation to the width of



the pass gap determining the relative quantities of radiation being retained in the cavity and escaping through the pass gap, and

detecting on the opposite side of the sheet relative quantities of both the projected radiation transmitted by the sheet and radiation reflected from the reflective bodies so as to produce an output response indicative of said property,

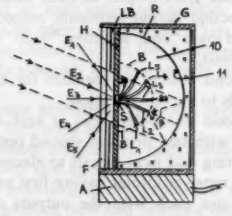
said relative quantities of retained and escaping radiation and detected transmitted and reflected radiation being selected to make said response substantially independent of changes in another property affecting the scattering power of the sheet material, such as the bone-dry weight or composition of paper.

4,052,616

INFRARED RADIATION-BURGLARY DETECTOR

Hansjurg Keller, Mannedorf, Switzerland, assignor to Cerberus AG, Mannedorf, Switzerland

Filed Nov. 4, 1976, Ser. No. 738,846
Claims priority, application Switzerland, June 30, 1976, 8330/76
Int. Cl.² G01J *1/00*
U.S. Cl. 250—353 **26 Claims**



1. An infrared radiation-burglary detector comprising radiation-focusing means having a focal surface, a radiation receiver, a bundle of radiation-conducting elements having radiation inlet openings and radiation outlet openings, the radiation

inlet openings being located substantially at the focal surface of the radiation-focusing means and the radiation outlet openings being located in front of the radiation receiver.

4,052,617

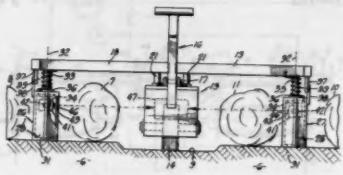
LETTUCE MATURITY GAGE

Roger E. Garrett, Davis, and Paul Christensen, El Macero, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Sept. 29, 1976, Ser. No. 727,683

Int. Cl.[2] G01N *23/00*

U.S. Cl. 250—360 **9 Claims**



1. A lettuce maturity gage comprising a cart body, means for supporting said cart body on the ground alongside a row of growing lettuce, means for advancing said cart body along said row, an outrigger body, means for articulating said outrigger body on said cart body for movement between an inner position near said cart body and an outer position away therefrom, a source of radiant energy in one of said bodies, a radiant energy receiver on the other of said bodies in position to receive energy radiated from said source, means for blocking radiation of energy from said source, and means for controlling the operation of said blocking means in accordance with the operation of said articulating means.

4,052,618

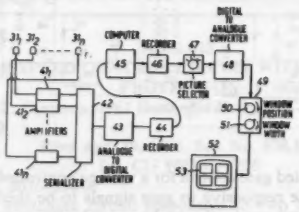
APPARATUS FOR EXAMINING A BODY BY RADIATION SUCH AS X OR GAMMA RADIATION

Godfrey Newbold Hounsfield, Newark, England, assignor to E M I Limited, Hayes, England

Division of Ser. No. 468,005, May 7, 1974, Pat. No. 3,944,833, which is a division of Ser. No. 349,198, April 9, 1973, Pat. No. 3,866,047, which is a continuation-in-part of Ser. No. 212,778, Dec. 27, 1971, Pat. No. 3,778,614, which is a continuation of Ser. No. 861,538, Aug. 21, 1969, abandoned. This application Feb. 12, 1976, Ser. No. 657,543

Int. Cl.[2] G01M *23/00*

U.S. Cl. 250—360 **5 Claims**



1. Medical radiographic device for diagnostic examination of a substantially planar region of the interior of the body of a patient, comprising:

a. means disposed, outside the body, for generating a spread of penetrating radiation which propagates substantially along the plane of the region and emerges therefrom after suffering absorption determined at least in part by its path through the body, said radiation traversing the body at a selected initial mean angle determined by an initial position of the generating means with respect to the body;

b. means for causing relative motion between the generating means and the patient to cause orbiting of the generating means about the body and the generation of said spread of penetrating radiation at a corresponding succession of further mean angles;

c. detector means comprising a plurality of detectors with apertures causing each detector to receive radiation at one time along a respective beam path, the beam paths respective to the different detectors being included within said spread of radiation and diverging from each other on moving away from said generating means;

d. said detector apertures moving relative to said generating means so that each detector receives radiation along a respective beam path through the body which successively assumes different angular positions within said spread;

e. means for deriving signals from the respective detectors relating to the radiation received along the respective beam path, each detector providing a sequence of output signals as orbiting occurs relating to the radiation received at many positions relative to the body; and

f. means for combining the signals derived from said plurality of detectors to form an image of said region, said image comprising a pattern of image elements, each image element corresponding to an element of said region.

4,052,619

METHOD AND APPARATUS FOR MEASURING AND ANALYZING RADIATION TRANSMITTED AT PLURAL ANGLES

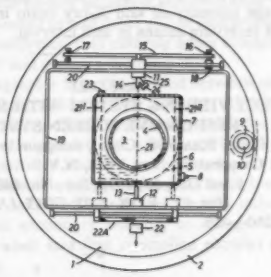
Godfrey Newbold Hounsfield, Newark, England, assignor to EMI Limited, Hayes, England

Filed Feb. 5, 1975, Ser. No. 547,337

Claims priority, application United Kingdom, Feb. 15, 1974, 6884/74

Int. Cl.[2] G01T *1/20*; G01N *13/04*

U.S. Cl. 250—363 S **6 Claims**

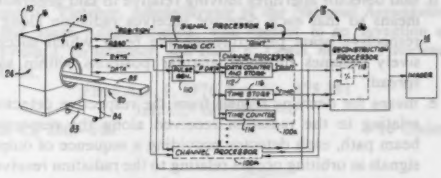


1. An apparatus for examining a body by means of penetrating radiation such as X- or γ-radiation including source means arranged to irradiate a cross-sectional slice of the body, detector means responsive to said radiation and disposed to receive said radiation after passage through the body along a plurality of substantially linear paths and to provide corresponding output signals for processing to construct a representation of the distribution of the absorption of the radiation over said slice, means for rotating the source and detector means around the body causing said source means to irradiate the slice from a plurality of directions and said detector means to provide further output signals, relating to further substantially linear paths, and processing means arranged to multiply some of the output signals derived from said detector means and relating to substantially the same path through the body, but obtained at different times during said rotation, by complementary factors which vary with the extent of said rotation and thereafter to combine said signals.

4,052,620
METHOD AND APPARATUS FOR IMPROVED RADIATION DETECTION IN RADIATION SCANNING SYSTEMS

Carl J. Brunnett, Mayfield Heights, Ohio, assignor to Picker Corporation, Cleveland, Ohio

Filed Nov. 28, 1975, Ser. No. 636,212
Int. Cl.[2] G01N *23/08*
U.S. Cl. 250—445 T 18 Claims

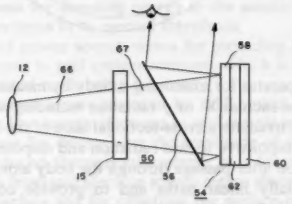


1. An X-ray scanning system comprising:
a. an X-ray source for producing a beam of X-rays;
b. beam receiving means disposed for receiving the X-ray beam and producing a train of pulses whose instantaneous repetition rate is indicative of the instantaneous intensity of the beams as it emerges from the object and inpinges upon an receiving means;
c. means supporting at least one of said X-ray source and beam receiving means for motion along a predetermined path relative to the object with said beam being scanned through said object during said motion;
d. timer means for generating a time signal having a value representative of the time elapsing between selected pulses of said pulse train which occur during a predetermined interval of said scanning motion;
e. a counter for counting pulses of the pulse train occurring within said time interval and producing a count signal; and,
f. means for comparing the count signal with the time signal for generating an average intensity signal indicative of the average intensity of said X-ray beam impinging on said beam receiving means in said interval.

4,052,621
OBJECT VIEWING SYSTEM WITH RADIATION RESPONSIVE SCREEN SYSTEM

David J. Haas, Stamford, Conn., assignor to North American Philips Corporation, New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,486
Int. Cl.[2] F21K *2/02*; G01T *1/20*
U.S. Cl. 250—458 11 Claims

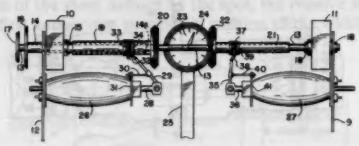


1. An object viewing system, comprising:
a. a radiation source;
b. means for converting a radiation image to a light image, said means being spaced from said radiation source and comprising a fluorescent layer and a light reflective layer, said fluorescent layer being more proximate to said radiation source than said reflective layer and said reflective layer being disposed so as to reflect light from said fluorescent layer in the direction of a radiation permeable light reflector; and
c. said radiation permeable light reflector located between said converting means and said source, said reflector comprising a light reflecting area that faces said fluorescent layer and being disposed so as to receive light from said converting means and reflecting said light toward an observer, said reflector being spaced from said radiation source such that said object can be located therebetween.

4,052,622
CHILD'S LAMP AND AUDIO DEVICE

Michael Lorenz, 421 55th St., Downers Grove, Ill. 60515

Filed Dec. 3, 1976, Ser. No. 747,400
Int. Cl.[2] H01H *7/00*
U.S. Cl. 307—112 3 Claims

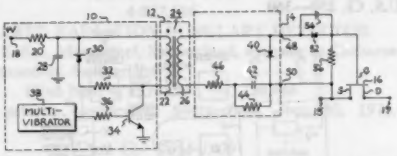


1. An electromechanical control arrangement for regulating the sound and light levels of an audio device and a lamp including a timer mechanism in combination with a potentiometer and dimmer device, said potentiometer and dimmer device being mounted in operative association with coaxial shafts disposed therebetween whereby the potentiometer and dimmer device can be actuated separately, a potentiometer drive member and a drive member for the dimmer device slidingly mounted on said shafts, said timer mechanism having a driving member, a pair of solenoids adapted to move said drive members into operative engagement with said driving member, and an electrical circuitry having a source of current whereby the solenoids may be activated to connect the potentiometer and dimmer device with the timer mechanism or to disconnect one or both from the timer mechanism.

4,052,623
ISOLATED SEMICONDUCTOR GATE CONTROL CIRCUIT

Hans O. Loberg, Northeast, Pa., assignor to General Electric Company, Erie, Pa.

Filed Aug. 10, 1976, Ser. No. 713,139
Int. Cl.[2] H03K *17/60*
U.S. Cl. 307—251 5 Claims



1. An isolated gate control for a voltage controlled semiconductor device responsive to gate signals to be thereby alternately rendered conductive and nonconductive comprising:
a. pulse generating means to provide a train of pulses at a frequency corresponding to the desired operational rate of the semiconductor device;
b. a transformer having primary and secondary windings;
c. means for connecting said pulse generating means to said primary winding whereby a pulse is induced into said secondary winding; and,
d. an output circuit connected to said secondary winding, said circuit including means for alternately providing relatively positive and negative going output voltage signals serving as gate signals to the semiconductor device, each of said output signals having minimum pre-

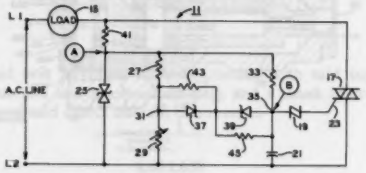
scribed absolute voltage values during periods corresponding to, respectively, the period of the pulses of said train and the period of time between adjacent pulses.

4,052,624

RAMP AND PEDESTAL CONTROL CIRCUIT

David C. Hamstra, Clinton, Iowa, assignor to General Electric Company, Fort Wayne, Ind.

Filed Apr. 7, 1976, Ser. No. 674,381
Int. Cl.[2] H03K *17/72*
U.S. Cl. 307—252 B **6 Claims**



1. A ramp and pedestal phase control circuit for controlling electrical energy supplied from an alternating current source to a load comprising:

a controllable alternating current switching device;

bilateral threshold means for enabling said switching device to conduct current from the source to the load when the magnitude of the voltage across said bilateral threshold means exceeds a predetermined value;

a first circuit for rapidly increasing the voltage across said bilateral threshold means to a value less than the predetermined value;

a second circuit for more slowly further increasing the voltage across said bilateral threshold means at least to the predetermined value so as to enable said switching device, said first and second circuits being effective on successive half cycles of the alternating current source to reverse the polarity of the voltage across said bilateral threshold means; and

means for minimizing the net direct current component of electrical energy supplied to the load, one of said first and second circuits including a resistive circuit element and a reactive circuit element in series relation and having a first circuit junction therebetween and the other of said first and second circuits including a pair of resistive circuit elements coupled in series relation and having a second circuit junction therebetween, said minimizing means comprising a pair of balancing resistors connected in series relation between said first and second circuit junctions.

4,052,625

MOTOR SPEED CONTROL CIRCUIT WITH OVERLOAD PROTECTION

George L. Cameron, 2961 Bostonian Drive, Los Alamitos, Calif. 90720

Filed Apr. 19, 1976, Ser. No. 678,181
Int. Cl.[2] H03K *17/08*
U.S. Cl. 307—252 K **4 Claims**

1. A switching circuit responsive to two complementary constant frequency pulses of variable duration for the controlled application of direct current power through a load, comprising:

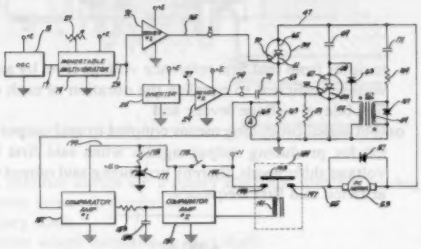
a first controlled rectifier having an anode, a cathode and a gate electrode, said cathode being adapted to be connected to a common circuit ground, said gate electrode and said common ground being adapted to be connected to a source of one of two complementary constant frequency pulses of variable duration for rendering said first controlled rectifier conductive;

a second controlled rectifier having an anode, a cathode and a. gate electrode, said cathode being connected to said common circuit ground, said gate electrode and said common ground being adapted to be connected to a source of the other of said two complementary constant frequency pulses of variable duration for rendering said second controlled rectifier conductive;

a turn-off capacitor connected between the anodes of said first and second controlled rectifiers for rendering said first controlled rectifier non-conductive when said second controlled rectifier is rendered conductive;

a transformer having primary and secondary windings, each of said primary and secondary windings having one end thereof connected to said common circuit ground, the polarity of the secondary winding being selected such that a current is conducted from the other end of said secondary winding in response to a current entering said one end of the primary winding;

a charging diode having an anode and a cathode, said anode being connected to said other end of said secondary winding of said transformer, said cathode being connected to



said anode of said second controlled rectifier and to one end of said turn-off capacitor for conducting a current from said secondary winding to charge said turn-off capacitor when said first controlled rectifier is rendered conductive;

a second diode having an anode and a cathode, said anode being connected to said other end of said primary winding of said transformer, said cathode being connected to said one end of said primary winding; and

a charging capacitor being connected between said anode of said first controlled rectifier and the other end of said primary winding of said transformer, said charging capacitor being charged through said second diode when said second controlled rectifier is rendered conductive, said charging capacitor being discharged through said primary winding of said transformer and thereby inducing a current in said secondary winding to charge said turn-off capacitor when said first controlled rectifier is rendered conductive.

4,052,626

FREQUENCY DOUBLER

Alois Vaclav Tuma, Schlieren, and Jörg Schiess, Stallikon, both of Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed Aug. 13, 1976, Ser. No. 714,123
Claims priority, application United Kingdom, Dec. 8, 1975, 50278/75
Int. Cl.[2] H03K *1/08, 1/16*
U.S. Cl. 307—271 **15 Claims**

1. A frequency doubler comprising:

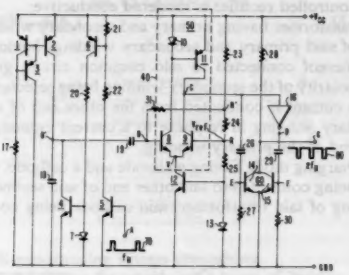
a differential amplifier including first and second input terminals and an output terminal;

first biasing means coupled to said differential amplifier for biasing said second input terminal at a first reference voltage level;

sawtooth means coupled to said first input terminal for providing a sawtooth voltage of a first frequency at said first input terminal for generating a first bilevel voltage at

said output terminal, said first bilevel voltage shifting levels when said sawtooth voltage equals said first reference voltage level;

second biasing means coupled to said first input terminal for biasing said first input terminal at a second reference voltage level, said second reference voltage level selected



to differ from said first reference voltage level by an offset voltage sufficient to equalize the duration of each of said first bilevel voltage levels; and

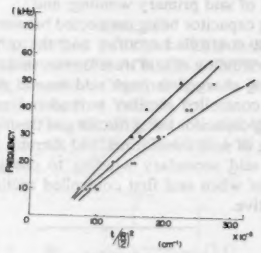
output signal producing means coupled to said output terminal for producing output signals when said first bilevel voltage shifts levels, thereby producing said output signals at twice said first frequency.

4,052,627

ULTRASONIC CERAMIC MICROPHONE

Daishiro Hayakawa, Neyagawa, and Kenroku Tani, Katano, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 6, 1976, Ser. No. 674,239
Claims priority, application Japan, Apr. 11, 1975, 50-44559
Int. Cl.[2] H04R *17/02, 17/10*
U.S. Cl. 310—322 **4 Claims**



1. An ultrasonic ceramic microphone comprising an electro-acoustic transducer including

a metal plate having a thickness t and a diameter R satisfying the relation

$$7.3 \times 10^{-3}\,\mathrm{cm}^{-1} < \frac{t}{(\frac{R}{2})^2} < 31.9 \times 10^{-3}\,\mathrm{cm}^{-1},$$

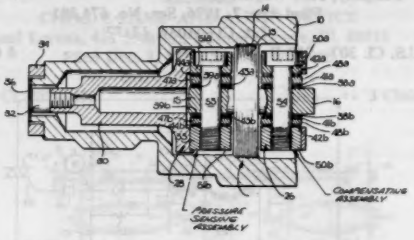
and a pair of piezoelectric ceramic plates disposed on the upper and lower surfaces of said metal plate, the diameters of said piezoelectric ceramic plates being less than the diameter of said metal plate, said ultrasonic ceramic microphone being operable in an operating frequency band including the fundamental frequency of the deflection vibration of said electro-acoustic transducer and at least two higher harmonics of said fundamental.

4,052,628

DYNAMIC, SHEAR-MODE PIEZOELECTRIC PRESSURE SENSOR

John R. Hayer, Yorba Linda, Calif., assignor to Gulton Industries, Inc., Metuchen, N.J.

Filed Apr. 19, 1976, Ser. No. 678,225
Int. Cl.[2] H01L *41/04*
U.S. Cl. 310—333 **7 Claims**



1. A dynamic pressure sensor comprising:

a housing;

a support member comprising a base for engaging said housing, a first mounting member having two parallel surfaces and an aperture disposed between said surfaces and a second mounting member having two parallel surfaces and an aperture disposed between said surfaces;

a first piezoelectric electric unit for providing an electrical signal when subjected to a dynamic shear load, said first unit being disposed on one of said two parallel surfaces of said first mounting member and including an aperture in alignment with said aperture of said first mounting member;

a second piezoelectric unit for providing an electrical signal when subjected to a dynamic shear load, said second unit being disposed on said other surface of said first mounting member and including an aperture in alignment with said aperture of said first mounting member;

bolt means disposed through said apertures of said first mounting member and said first and second piezoelectric units for securing said units to said first mounting member;

coupling means for receiving dynamic pressure loads and for coupling said loads to said bolt means; and,

piezoelectric sensing means for sensing acceleration mounted to said second mounting member, said sensing means for providing compensation for acceleration;

whereby dynamic pressure sensed by said coupling means is coupled to said bolt means thereby placing shear loads on said first and second piezoelectric units.

4,052,629

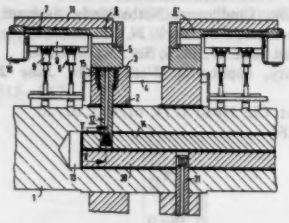
ROTATING RECTIFIER ASSEMBLY

Heinrich Küter, Wattenscheid, and Gerhard Krieger, Mulheim, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Nov. 26, 1975, Ser. No. 635,674
Claims priority, application Germany, Dec. 5, 1974, 2457585
Int. Cl.[2] H02K *11/00*
U.S. Cl. 310—68 D **7 Claims**

1. In an electrical machine having a rotary shaft, a rotating rectifier assembly connected in a three-phase current bridge circuit and comprising two support wheels mounted on the shaft in insulated relationship with respect thereto and formed with respective annular flanges, active components of the rectifier assembly comprising heat sinks, rectifier cells and fuses disposed at the inner periphery of said annular flanges, said two support wheels forming direct current poles and comprising an intermediate ring formed of nonmagnetic material insulatedly mounted on the shaft and a support wheel hub directly shrink-fitted on said intermediate ring, the shaft being formed with an axial bore, direct current conductors disposed

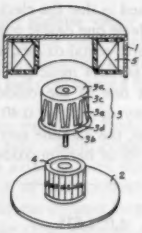
in said axial bore, and at least one current connecting bolt radially passing through said intermediate ring and into the shaft, said bolt having a head in contact with said support wheel hub and said intermediate ring, and a shank in contact with one of said direct current conductors.



4,052,630
SYNCHRONOUS MICROMOTOR

Tokuzo Inariba, c/o Room No. 906, Kamiuma Mansion, No. 2-9, Kamiuma 4-chome, Setagaya, Tokyo, Japan

Filed Nov. 25, 1975, Ser. No. 635,094
Claims priority, application Japan, Nov. 25, 1974, 49-135758
Int. Cl.[2] H02K *21/14*
U.S. Cl. 310—162 **19 Claims**

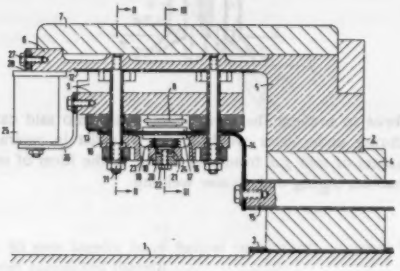


1. In a synchronous micromotor, outer coil means circumferentially surrounding a predetermined axis, a rotary rotor shaft extending along said axis and surrounded by said outer coil means, annular permanent magnet means surrounding said rotor shaft and situated coaxially between the latter and said coil means, said annular permanent magnet means having a series of north and south poles circumferentially distributed therealong with said north poles alternating with said south poles and all of said poles being directed outwardly toward said coil means, cylindrical wall means made of a soft magnetic material and circumferentially surrounding said annular permanent magnet means while being situated between the latter and said coil means, said cylindrical wall means having a pair of annular yoke portions spaced from each other along said axis and surrounding said axis, and said cylindrical wall means being formed between said yoke portions with a series of elongated separate apertures circumferentially spaced from each other and each extending from one to the other of said yoke portions up to but not beyond said yoke portions and said series of apertures being made up of two groups of apertures one of which is inclined helically in one direction with respect to said axis and the other of which is inclined helically in an opposite direction with respect to said axis and the apertures of said one group alternating with the apertures of said other group so that said annular yoke portions are bridged by and integral with a series of elongated tapered wall portions of said cylindrical wall means with said tapered wall portions alternately tapering in opposed axial directions, said cylindrical wall means and said annular permanent magnet means forming a pair of means one of which is connected with said rotor shaft for rotary movement therewith, to form a rotor assembly with said shaft, while the other of said pair of means and said coil means form part of a stator assembly.

4,052,631
ROTARY RECTIFIER DEVICE FOR ELECTRIC MACHINES

Heinrich Kuter, Wattenscheid, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Mar. 4, 1976, Ser. No. 664,050
Claims priority, application Germany, Mar. 17, 1975, 2511636
Int. Cl.[2] H02K *11/00*
U.S. Cl. 310—68 D **9 Claims**



1. A rectifier device for a rotary electrical machine having an electric terminal, comprising:
a rotary shaft;
a carrier wheel mounted on said shaft;
a disc type rectifier;
a first clamping member secured to said carrier wheel and disposed radially outward from said rectifier, said rectifier having a pair of faces and being mounted by one of said faces on said first clamping member;
a second clamping member secured to said carrier wheel and disposed radially inwardly from said rectifier;
mounting means resiliently secured between said second clamping member and the other face of said rectifier to resiliently urge contact between said rectifier and said clamping members, and a flexible lead connected between the terminal of the machine and said second clamping member, said resilient mounting means urging said lead into contact with said other face of said rectifier.

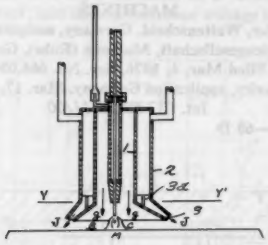
4,052,632
METHOD OF UNDERWATER WELDING

Hideo Sagara; Yasuhiro Nishio; Hirokazu Wada, and Yoshinori Hiromoto, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Division of Ser. No. 384,897, Aug. 2, 1973. This application Aug. 12, 1974, Ser. No. 496,830
Claims priority, application Japan, Sept. 4, 1972, 47-87934
Int. Cl.[2] B23K *9/16*
U.S. Cl. 219—137 R **3 Claims**

1. A method of welding underwater, comprising:
feeding welding rod means to a region where a member is to be welded and heating the welding rod means to effect welding of said member in said region;
confining a first space extending down to close to said region;
confining a second space extending annularly of the first confined space,
said confining causing the first space to flare close to said region to define a cavity within which said welding is effected and causing the annular second space to define a flaring annular nozzle of decreasing width of cross-sectional area surrounding said cavity;
conducting a pressurized stream of weld-shielding gas down through the first space and into said cavity for expelling

water therefrom, for preventing the invasion of water into said cavity and for shielding said welding; and conducting a stream of water down through the second space and out said flaring annular nozzle with sufficient



force to prevent the invasion of water into said cavity during underwater welding and to assist in aspirating excess of said gas from said cavity in the form of small bubbles during underwater welding.

4,052,633

RESTORABLE COLD CATHODE IN A GAS DISCHARGE ELECTRON GUN

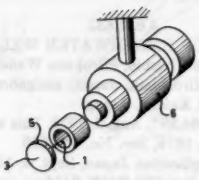
Theodorus Maria Berendina Schoenmakers, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 8, 1975, Ser. No. 575,614

Claims priority, application Netherlands, May 30, 1974, 7407254

Int. Cl.[2] H01J *3/02, 7/24, 17/06*

U.S. Cl. 313—146 **7 Claims**



1. A gas discharge electron gun for generating an electron beam by means of a glow discharge comprising an envelope, means to maintain a gaseous ionizable medium inside said envelope, at least an anode and a cathode between which the said glow discharge takes place, from which cathode electrons are released by secondary emission in such a quantity that the said electron beam consists mainly of said electrons and which cathode has a shape that reduces the erosion occurring at the cathode surface, and wire means for restoring the eroded material in the active part of the cathode surface at least partly during operation of the gas discharge electron gun, said wire means comprising a plurality of slideable concentric cylinders extending through an aperture in the active surface of the cathode.

4,052,634

HIGH-PRESSURE GAS DISCHARGE LAMP AND ELECTRON EMISSIVE ELECTRODE STRUCTURE THEREFOR

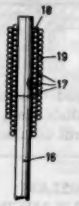
Johannis De Kok, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 17, 1976, Ser. No. 697,148

Claims priority, application Netherlands, June 20, 1975, 7507356

Int. Cl.[2] H01J *1/14, 61/073, 61/20*

U.S. Cl. 313—184 **7 Claims**



1. A high-pressure gas discharge lamp having a radiation transmissive envelope containing electrodes and an ionizable medium in which the discharge is maintained, at least one of the electrodes consisting of a support of a high-melting metal provided with an electron emissive material which contains an alkaline earth metal and at least one of the metals tungsten and molybdenum, characterized in that the electron emissive material mainly consists of at least one oxidic compound containing at least one of the rare earth metal oxides, alkaline earth metal oxide in a quantity of 0.66 to 4 mole per mole of rare earth metal oxide and at least one of the oxides of tungsten and molybdenum in a quantity of 0.25 to 0.40 mole per mole of alkaline earth metal oxide, the alkaline earth metal oxide consisting of at least 25 mol.% of barium oxide.

4,052,635

ELECTRIC DISCHARGE LAMP

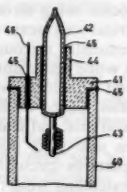
Cornelis Adrianus Joannes Jacobs, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 27, 1976, Ser. No. 727,035

Claims priority, application Netherlands, Sept. 29, 1975, 7511416

Int. Cl.[2] H01J *61/06*

U.S. Cl. 313—217 **4 Claims**



1. An electric discharge lamp having a ceramic lamp vessel in the wall of which are incorporated cylindrical current leadthroughs of niobium or tantalum which are connected at one end to the electrodes and project at the other beyond the lamp vessel, means being present to protect the leadthroughs against attack by gas surrounding the lamp vessel, wherein the parts of the current leadthroughs which during operation have a temperature of more than 500° C are screened from the gas surrounding the lamp vessel by means of ceramic mouldings which are connected in a gas-tight manner to the current leadthroughs by means of sealing material.

4,052,636

HIGH PRESSURE SODIUM VAPOR LAMP STABILIZED FOR PULSE OPERATION

Jack M. Strok, Northfield, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 2, 1976, Ser. No. 710,487
Int. Cl.[2] H01J *61/06*
U.S. Cl. 313—217 11 Claims

1. A high pressure sodium vapor lamp arc tube for high frequency short duty cycle pulse operation comprising:
an elongated light-transmitting ceramic tube having closures sealing its ends and containing a filling of sodium-mercury amalgam;
a pair of electrodes supported from said closures at opposite ends of said tube, each comprising a body portion mounted on an axial tungsten shank,
the insertion depth of said electrodes into the tube being at least 10% of the gas column length therein,
and the ratio of the cross-sectional area of the body portion of said electrodes to the cross-sectional area of the bore of the tube being in the range of 0.3 to 0.4.

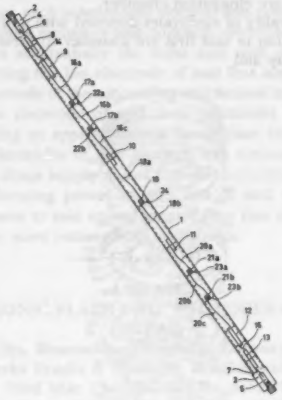
4,052,637

HALOGEN INCANDESCENT LAMP

Herbert Kamiel Maria Op de Beeck, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 26, 1976, Ser. No. 745,489
Claims priority, application Netherlands, Dec. 8, 1975, 7514249
Int. Cl.[2] H01K *1/18*
U.S. Cl. 313—222 6 Claims

1. A halogen incandescent lamp having (a) a tubular light-pervious lamp vessel provided at its ends with vacuum-tight seals in which current leadthrough conductors are incorporated, (b) a filament which extends longitudinally in the lamp vessel and is connected to current leadthrough conductors and has several helically wound filament sections separated spatially by connection conductors, and (c) supports in contact with the filament and with the wall of the lamp vessel which fix the filament in the transverse direction, characterized in that filament sections and connection conductors constitute one structural unit and that at least connection conductors between filament sections which have a mutual distance of at



least 40 mm locally have helical turns short-circuited by a support connected thereto.

4,052,638

FLARE-WEDGE LAMP

Robert J. Love, Lyndhurst, and James C. Graff, Cleveland Heights, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 27, 1976, Ser. No. 661,976
Int. Cl.[2] H01J *5/48, 5/50*
U.S. Cl. 313—318 16 Claims

1. An all-glass incandescent lamp comprising:
a flare having a cylindrical portion and a conical portion;
at least two conductive leads and an exhaust tube positioned within said flare; and
wherein the cylindrical end of said flare is collapsed about said conductive leads and exhaust tube to form a base.

4,052,639

SPARK GAP FOR ACHIEVING ARC ELONGATION AND COMPRESSION WITHOUT THE USE OF SUPPLEMENTARY MAGNETIC MEANS

Francis V. Cunningham, Western Springs, Ill., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.

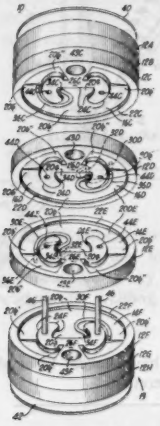
Filed Jan. 13, 1976, Ser. No. 648,758
Int. Cl.[2] H01J *17/00, 21/00*
U.S. Cl. 313—325 11 Claims

1. A spark gap comprising
a first insulating gap plate,
a second insulating gap plate,
a third insulating gap plate,
means for retaining said first and third gap plates contiguously disposed about said second gap plate in a vertical stack along a first vertically extending longitudinal axis,

facing surfaces of said first and second gap plates forming a first arc elongation chamber,

facing surfaces of said second and third gap plates forming a second arc elongation chamber,

a first plurality of electrodes disposed with a first horizontal orientation in said first arc chamber to form a first electrode gap and



a second plurality of electrodes disposed with a second horizontal orientation in said second arc chamber to form a second electrode gap,

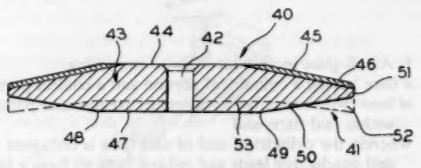
said first and second horizontal orientations being substantially identical such that said first and second electrode gaps are disposed in said vertical stack in vertical alignment along a second vertically extending axis disposed parallel to said first axis.

4,052,640

ANODES FOR ROTARY ANODE X-RAY TUBES

Robert E. Hueschen, Hales Corners, Wis., and John H. Port, Solon, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed June 21, 1976, Ser. No. 697,849
Int. Cl.² H01J *35/08*
U.S. Cl. 313—330 **5 Claims**



1. An anode for use in a rotary anode x-ray tube, comprising:

a disc having an axis of rotation and comprised of a first metallic material, said disc having a front and a rear face and said first metallic material being of uniform composition and being uninterrupted from said front to said rear face,

said front face having a substantially unbeveled central region circumjacent said axis and an adjacent annular region which is beveled rearwardly at an acute angle relative to a plane to which said axis of rotation is perpendicular,

said rearwardly beveled annular region having a surface layer comprised of a second metallic material having a different coefficient of thermal expansion than said first metallic material, said surface layer providing a focal spot surface on which the electron beam of an x-ray tube impinges to produce x-radiation an incident of which is to produce a high temperature gradient in said disc in the region adjacent said front face,

said rear face having a substantially unbeveled central region circumjacent said axis and an adjacent annular region which is beveled forwardly at an acute angle relative to a plane to which said axis is perpendicular,

the configuration of said anode for minimizing distortion of said disc due to cyclical occurrence of said high temperature gradient being defined by the equation

$$\phi = \arctan\left[\frac{W-(r_2-r_1)\tan\theta}{r_2-r_0}\right]$$

where:

r_0 is the rear unbeveled surface radius;

r_1 is the front unbeveled surface radius;

r_2 is the total anode radius;

W = T-E where T is the total thickness of the anode and E is the thickness of the peripheral edge of the anode;

θ is the angle between the front rearwardly beveled surface and a plane to which said axis of rotation is perpendicular; and

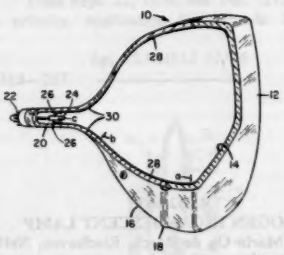
ϕ is the angle between the rear forwardly beveled surface and a plane to which said axis of rotation is perpendicular.

4,052,641

ELECTRICALLY CONDUCTIVE COATING IN CATHODE RAY TUBE

Ellen K. Dominick, and Dale R. Wexell, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 558,276, March 14, 1975, abandoned. This application May 24, 1976, Ser. No. 688,977
Int. Cl.² H01J *29/00, 31/00*
U.S. Cl. 313—450 **8 Claims**

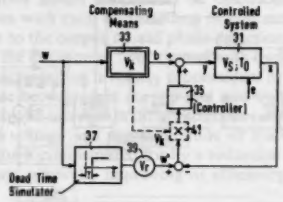


1. In a cathode ray tube comprising a glass faceplate upon which a viewing screen is mounted, a glass neck portion within which an electron gun is mounted, and a glass funnel portion having an electrically conductive coating on at least a portion of its inner wall, the improvement comprising a coating mixture fired at 350°–525° C. to a hard, smooth, glassy, electrically conductive coating exhibiting good durability and resistance to weathering, said coating consisting essentially, in weight percent of total solids, of 5–25% total of at least one of the alkali metal oxides Na_2O, K_2O, and Li_2O, 20–80% SiO_2, 2–25% of at least one oxide selected from the group consisting of Ag_2O, CuO, CdO, CaO, SrO, BaO, CoO, PbO, MgO, HgO, NiO, ZnO, and MnO, 10–50% carbon, and 0–50% of a filler pigment, the total of silica and pigment being 45–85%.

4,052,642
APPARATUS FOR CONTROLLING CONTROLLED SYSTEMS WITH DEAD TIME

Winfried Speth, Ulm; Walter Dreiseitl; Klaus Böhm, both of Erlangen; Lothar Schleicher, Erlangen, and Herbert Polster, Spardorf, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 11, 1976, Ser. No. 665,873
Claims priority, application Germany, Mar. 12, 1975, 2510837
Int. Cl.² G05B *13/00*
U.S. Cl. 318—561 **7 Claims**



1. In an apparatus for controlling a controlled system, including a final control element with dead time, said apparatus including a controller with an integral characteristic, the improvement comprising:

a. means generating a reference value;

b. a dead time simulator, the dead time of which corresponds approximately to the dead time of the controlled system, having as in input said reference value and providing an output;

c. means associated with said control system providing as an output an actual value of the controlled system;

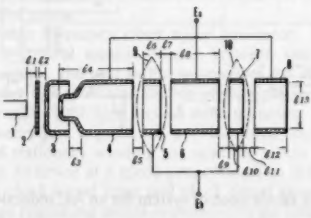
d. first summing means having as inputs the output of said dead time simulator and said actual value, the output of said summing means being coupled as an input to the controller with an integral characteristic whereby said controller will be supplied with a signal dependent upon the difference between the output signal of the dead time simulator and the actual value signal at its input, the output of said controller being coupled as an input to the final control element of said controlled system.

e. means coupling said reference value in a bypass path around said dead time simulator and controller so that it forms a further input to the final control element of the controlled system.

4,052,643
ELECTRON GUNS FOR USE IN CATHODE RAY TUBES

Eiichi Yamazaki, Ichihara; Hiromi Kanai, and Toshio Hurukawa, both of Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 534,646, Jan. 23, 1975, Continuation of Ser. No. 349,065, April 9, 1973. This application Aug. 2, 1976, Ser. No. 710,590
Claims priority, application Japan, Apr. 12, 1972, 47-42438
Int. Cl.² H01J *29/46, 29/56*
U.S. Cl. 315—16 **7 Claims**

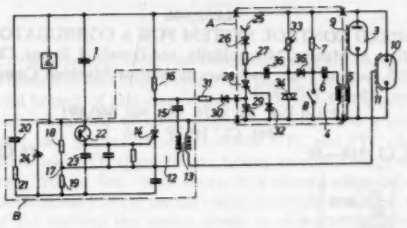


1. In a cathode ray tube image system an electron gun in a cathode ray tube comprising a single gun monobeam electron source and a main electron lens combination aligned on the axis of said gun which includes first and second axially aligned independent electron lens systems having a common electrode therebetween, each independent electron lens system including three electrodes including said common electrode arranged in sequence on substantially the same axis with said common electrode being the last electrode of said first lens system and the first electrode of the succeeding said second lens system, an intermediate electrode of said three electrodes in each said system having an applied voltage lower than that applied to the other electrodes of said electron lens system, and means including voltage supply means for said electrodes for making the beam focusing power of said first of said electron lens systems closest to said source greater than that of succeeding lens systems more remote from said source.

4,052,644
ELECTRONIC FLASH UNIT WITH OPERATIONAL SIGNAL

Stefan Borejko, Braunschweig-Broitzem, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Mar. 15, 1976, Ser. No. 666,674
Claims priority, application Germany, Mar. 19, 1975, 2511910
Int. Cl.² H05B *41/32;* G01J *1/16*
U.S. Cl. 315—151 **10 Claims**



1. An electronic flash unit, comprising a flash tube, a storage capacitor dischargeable through said flash tube, flash measuring means responsive to the quantity of light emitted by the flash tube and reflected back from a photographic subject being photographed, a pulse generator circuit device, means for rendering said pulse generator circuit device operative to produce a pulse when an adjustable value of light has been measured by said measuring means, a flash tube quenching device, and means for rendering said quenching device operative in response to said pulse, characterized by a direct current source (25), an electronic switch, a light-emitting diode (29) connected to said direct current source (25) through said electronic switch, means for closing said electronic switch in response to a signal derived from one of said devices, and means for opening said electronic switch automatically after an adjustable closing period.

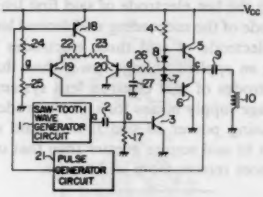
4,052,645
VERTICAL DEFLECTION CIRCUIT

Osamu Fujita, Chigasaki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed June 14, 1976, Ser. No. 695,402
Claims priority, application Japan, June 20, 1975, 50-76064; June 20, 1975, 50-76065; June 20, 1975, 50-76066; June 24, 1975, 50-79523; June 24, 1975, 50-79524; June 25, 1975, 50-79591
Int. Cl.² H01J *29/70, 29/72*
U.S. Cl. 315—388 **10 Claims**

1. A vertical deflection circuit comprising a saw-tooth wave voltage generator circuit, a drive stage coupled to the output terminal of said saw-tooth wave voltage generator circuit

through an input coupling capacitor, a vertical amplifier stage directly coupled to said drive stage, and a vertical amplifier stage bias voltage stabilizing circuit including a differential amplifier circuit fed by a constant current source having a constant current circuit which operates only during a retrace period, a first input terminal of said differential amplifier circuit and a second input terminal of said differential amplifier circuit being connected to an output terminal of a circuit producing a mean voltage at the output terminal of said vertical amplifier stage, an first output terminal of said differential amplifier circuit being connected to the junction of said input coupling capacitor and the input terminal of said drive stage.

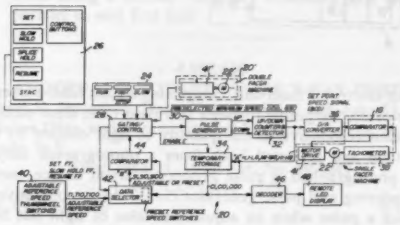


4,052,646

SPEED CONTROL SYSTEM FOR A CORRUGATOR

William A. Massey, Mount Holly, and Donald J. Evans, Cherry Hill, both of N.J., assignors to Molins Machine Company, Inc., Cherry Hill, N.J.

Filed Feb. 24, 1976, Ser. No. 660,891
Int. Cl.[2] H02P 5/46
U.S. Cl. 318—39 **16 Claims**



1. An improved speed control for a corrugator having at least one single facer machine operatively associated with a double facer machine, each of said machines including a motor, comprising:

digital means for automatically generating a preselected digital set point signal indicative of a preselected minimum speed for the single facer machine motor;

digital means for generating first and second digital set point signals indicative of first and second speeds for said single facer machine motor, said first and second speeds being not less than said preselected minimum speed;

digital means for selectively storing said first digital set point signal while the speed of the single facer machine motor is varied;

means for automatically bringing the single facer machine motor speed up to said preselected minimum speed in response to said preselected digital set point signal and for varying the speed of the single facer machine motor between said first and second speeds in response to said first and second digital set point signals; and

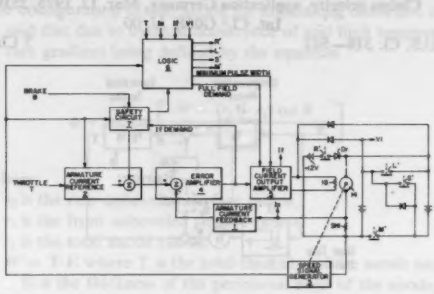
means for automatically restoring the single facer machine motor speed to said first speed in response to said stored digital set point signal.

4,052,647

OPTIMUM BATTERY RECONNECT FOR A FIELD CONTROLLED ELECTRIC VEHICLE

Francis T. Thompson, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 28, 1974, Ser. No. 437,405
Int. Cl.[2] H02D 7/06
U.S. Cl. 318—139 **20 Claims**



1. An electric vehicle comprising:

a direct current drive motor;

a separately excited field winding disposed within said direct current drive motor;

a plurality of electric batteries connectable in a high voltage connection and a low voltage connection for supplying power to the armature of said direct current drive motor;

a throttle connected to control current flow through said separably excited field winding which regulates armature current and output torque of said direct current drive motor;

switching means for changing the connection of said plurality of batteries as a function of drive motor speed, armature current, battery voltage and throttle setting; and,

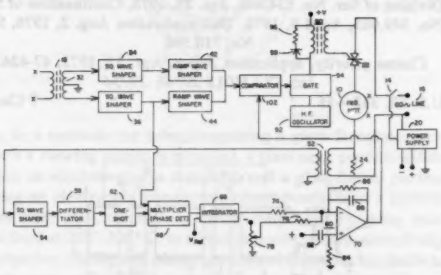
current limiting means for regulating the maximum armature current which can flow through said direct current drive motor to prevent damage to said electric vehicle components.

4,052,648

POWER FACTOR CONTROL SYSTEM FOR AC INDUCTION MOTORS

Frank J. Nola, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,425
Int. Cl.[2] H02K 17/04
U.S. Cl. 318—200 **5 Claims**



1. A power factor control system for an AC induction motor comprising:

current sampling means including means adapted to be placed in circuit with each phase winding of a said motor

for providing an AC output signal in phase with the current through said winding;

voltage sampling means adapted to sense the voltage of an electrical input applied to said winding and for providing an output signal in phase with said voltage across said winding;

phase detection means responsive to the outputs of said current sampling means and said voltage sampling means for providing an output which varies in accordance with the difference in phase between said current and said voltage; and

a control means adapted to be electrically connected in series with each said winding of said motor, and responsive to the output of said phase detection means for varying the duration of "on" time of each cycle of input power to said winding inversely proportional to the difference in phase between said current and said voltage;

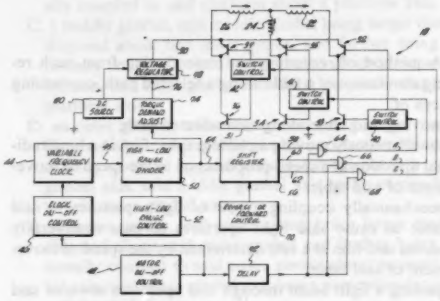
whereby an increase in difference between the magnitude of said voltage and the magnitude of load applied to said motor is compensated for by a reduction in power to said motor, generally improving its efficiency.

4,052,649

HAND HELD VARIABLE SPEED DRILL MOTOR AND CONTROL SYSTEM THEREFOR

Jack E. Greenwell, and Alexander Prokop, both of Reno, Nev., assignors to Lear Motors Corporation

Filed June 18, 1975, Ser. No. 588,010
Int. Cl.² H02P 3/24
U.S. Cl. 318—212 **21 Claims**



1. In a hand held dental drill and control system therefor, the combination which comprises:

an induction motor having a three phase stationary winding and a rotor;

a chuck carried by said rotor of the motor for releasably securing a dental drilling tool;

a source of direct current;

a pair of power supply conductors;

an inverter, the inverter including a plurality of solid state switching devices connected across said power supply conductors, a junction intermediate each pair of said switching devices connected to respective phase windings of the motor;

a variable frequency clock signal generator;

switch control means coupled between said clock signal generator and said switching devices for alternately rendering one switching device of each pair conducting and the other switching device nonconducting in a predetermined phase sequence to provide three phase current for said stationary winding to cause the motor to rotate in a first direction at a speed proportional to the frequency of the clock signal from said clock signal generator; and

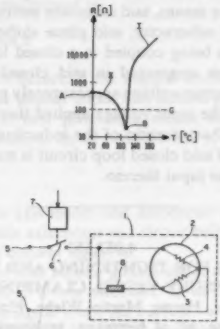
voltage regulating means responsive to the clock signal from said clock signal generator and connected between the source of direct current and the power supply conductors for providing a direct current voltage across the supply conductors which varies in accordance with the frequency of the clock signal from said clock signal generator over a pre-established range.

4,052,650

STARTING DEVICE FOR A SINGLE-PHASE MOTOR

Asger Gramkow, Gammelgard, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 275,159, July 26, 1972. This application Nov. 16, 1973, Ser. No. 416,527
Int. Cl.² H02P 1/44
U.S. Cl. 318—221 H **3 Claims**



1. A single-phase motor assembly including circuit means, a first branch of said circuit means containing a main winding, a second brance of said circuit means in parallel with said first branch containing winding means for starting and a starting resistor, said resistor having sequential NTC and PTC characteristics, said NTC characteristic having an ohmic range which extends from a first value above to a second value below a predetermined critical ohmic value at which a current sufficient for starting the motor flows in said starting winding means, said first value being on the order of approximately ten times said second value and being at least several times said critical value, said PTC characteristic having an ohmic range which extends from a value below to a value above said critical ohmic value.

4,052,651

ELEVATOR SPEED CONTROL SYSTEM

Hiroshi Kamaike, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1975, Ser. No. 645,295
Claims priority, application Japan, Dec. 27, 1974, 49-3901
Int. Cl.² B66B 1/30
U.S. Cl. 318—230 **5 Claims**

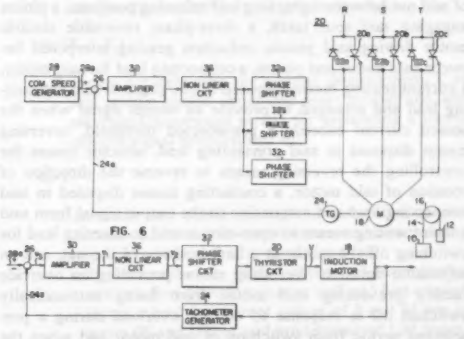


FIG. 6

1. An elevator speed control system for controlling the rotational speed of an induction motor for driving an elevator

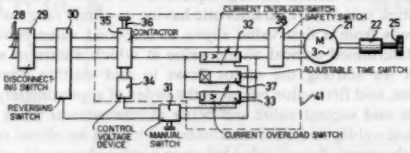
car, comprising an induction motor, a thyristor means for controlling the voltage applied to said induction motor, a command speed signal generator for generating a command speed signal for the rotational speed of said induction motor, a tachometer generator coupled to said induction motor to generate a speed signal representing the actual rotational speed of said induction motor, a subtacter coupled to both said command speed signal generator and said tachometer generator to produce a difference signal between the output signals from both said generators, phase shifter means coupled between said subtracter and said thyristor means and responsive to said difference signal from said subtracter to produce firing signals for said thyristor means, said induction motor, said tachometer generator, said substracter, said phase shifter means and said thyristor means being coupled in a closed loop circuit, and a nonlinear circuit connected in said closed loop circuit for producing an output voltage approximately proportional to the square root of the input voltage applied thereto and offsetting the nonlinear characteristic of the induction motor, whereby the loop gain of said closed loop circuit is maintained constant regardless of the input thereto.

4,052,652

APPARATUS FOR TIGHTENING AND RELEASING A PRESSURE VESSEL CLAMPING NUT

Andre Simnovec, Herne; Martin Wiebe, Hattingen, and Willi Berndt, Herne, all of Germany, assignors to Schwing Hydraulik Elektronik KG, Herne, Germany

Filed Sept. 24, 1975, Ser. No. 611,610
Claims priority, application Germany, Oct. 15, 1974, 2449009
Int. Cl.² H02H 7/08
U.S. Cl. 318—476 **6 Claims**



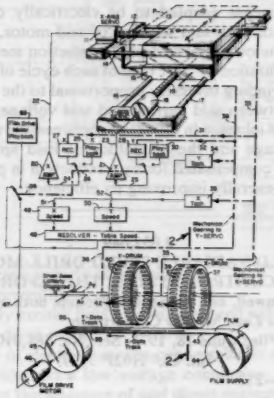
1. In a pressure vessel having a flange containing bolts held and pretensioned therein, said bolts having nuts which are tightened to maintain pre-established pressure-tight sealing of the vessel and released electromechanically, the apparatus comprising a clamping nut threadedly engaging a bolt and movable axially in one direction to effect pressure-tight clamping and to effect release in the opposite direction, longitudinally extending spur teeth formed on the outside of said nut in circular form, means providing limited longitudinal movement of said nut between tightening and releasing positions, a pinion engaging said spur teeth, a three-phase reversible electric motor driving said pinion, reduction gearing interposed between said motor and pinion, a connecting lead for said motor, a current sensing means disposed in one phase of said connecting lead and arranged to provide an output signal when the sensed current exceeds a pre-selected threshold, reversing means disposed in said connecting lead, selector means for controlling the reversing means to reverse the direction of rotation of said motor, a contacting means disposed in said connecting lead and responsive to the output signal from said current sensing means to open-circuit said connecting lead for switching off the motor at a limit position of the nut, and an adjustable duration overriding means providing an override facility preventing said motor from being automatically switched off in response to current overload during a preselected period from switch-on of said motor and when the motor rotor has the smallest possible number of poles for a small moment of inertia and high speed of rotation.

4,052,653

ANALOG DATA RECORDING AND PLAYBACK SYSTEM FOR PATH CONTROL

William E. Marantette, and Ruth B. Marantette, both of 20624 Earl St., Torrance, Calif. 90503

Filed Nov. 19, 1975, Ser. No. 633,484
Int. Cl.² G05B 19/42
U.S. Cl. 318—568 **2 Claims**



1. A method of recording and reproducing from such recording movement of a table along a selected path, comprising the steps of:

a. moving said table along said selected path;

b. simultaneously moving a photographic film in a longitudinal direction at a speed proportional to the speed of movement of said table;

c. mechanically coupling a row of light apertures to said table to cause said light apertures to pass transversely across said film at a rate determined by the speed of movement of said table;

d. passing a light beam through said apertures towards said film to thereby successively expose on said film bars of light images as said film moves, said bars being skewed relative to the direction of movement of said film in accordance with the relative rate of movement of said apertures and speed of movement of said film whereby there is optically recorded on said film a pattern of bars of light images defining the movement of the table along said selected path;

e. moving said film in a longitudinal direction at a selected speed;

f. providing a row of light apertures mechanically coupled to said table so that they will pass transversely across said film once said table moves, said light apertures being spaced relative to each other the same as the light apertures utilized in recording;

g. passing light from two sources through two adjacent bars of light images on said film and two adjacent apertures overlying said film;

h. detecting the relative intensities of the light from each of the two sources, and

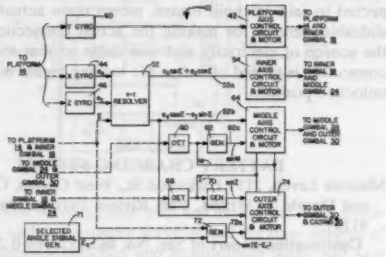
i. moving said table to thereby move said apertures in response to the difference in light intensities in a direction to minimize such difference so that the apertures will stay in synchronism with the bars of light images on the moving film and said table will follow said selected path defined by the pattern of bars of light images on said film.

4,052,654

GYRO STABILIZED INERTIAL REFERENCE SYSTEM WITH GIMBAL LOCK PREVENTION MEANS

Manuel Kramer, Mountain-View, Calif., and Douglas J. Dapprich, Watertown, Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Sept. 22, 1975, Ser. No. 615,589
Int. Cl.[2] B64C 17/06
U.S. Cl. 318—649 12 Claims



1. A four axis gyro-stabilized inertial reference system comprising:

A. a platform having an associated cartesian coordinate system with a fixed spatial orientation, said coordinate system including X, Y and Z axes,

B. an inner gimbal, said inner gimbal being larger than and disposed about said platform and further being rotationally coupled to said platform about a platform axis,

C. a middle gimbal, said middle gimbal being larger than and disposed about said inner gimbal and further being rotationally coupled to said inner gimbal about an inner gimbal axis, said inner gimbal axis being perpendicular to said platform axis,

D. an outer gimbal, said outer gimbal being larger than and disposed about said middle gimbal and further being rotationally coupled to said middle gimbal about a middle gimbal axis, said middle gimbal axis being perpendicular to said inner gimbal axis,

E. an outer casing, said outer casing being larger than and disposed about said outer gimbal and further being rotationally coupled to said outer gimbal about an outer gimbal axis, said outer gimbal axis being perpendicular to said middle gimbal axis,

F. a platform stabilizing means for maintaining said platform in a fixed spatial orientation, wherein said stabilizing means comprises:

i. a platform axis control means including:

a. a Y-gyro having a first detection means for detecting angular displacement of said platform about said Y-axis, and means for generating an associated J error signal proportional thereto,

b. a platform axis motor and associated control circuit responsive to said J-error signal to displace said platform about said platform axis so as to null said J-error signal,

ii. an inner axis control means including:

a. an X-gyro having a second detection means for detecting the angular displacement of said platform about said X-axis, and means for generating an associated X-error signal e_x proportional thereto,

b. a Z-gyro having a third detection means for detecting the angular displacement of said platform about said Z axis, and means for generating a Z-error signal e_z proportional thereto,

c. an *x-z* angular error resolver, said first resolver being responsive to said X and Z-error signals to the angular displacement, E, of said inner gimbal about said platform axis, to generate a V-error signal proportional to:

$$e_x \sin E + e_z \cos E$$

d. an inner axis motor and associated control circuit responsive to said V-error signal to displace said inner gimbal about said inner gimbal axis so as to null said V-error signal,

iii. a middle axis control means including:

a. said X-gyro and Z-gyro,

b. said x-z angular error resolver, said resolver being further responsive to said X and Z-error signals and to the angular displacement, E, of said inner gimbal about said platform axis to generate a first control signal proportional to:

$$e_x \cos E - e_z \sin E$$

c. means for detecting the angular displacement, M, of said outer gimbal about said middle gimbal axis, and associated first generating means for generating a second control signal proportional to:

$$\sin M$$

d. a middle axis motor and associated control circuit, said middle axis motor and circuit being responsive to said first control signal to:

i. displace said middle gimbal about said middle gimbal axis in a first direction, so as to null said first control signal when the current values of the I and M are in zones **(1)**, **(3)**, **(5)** and **(6)** of twelve predetermined I-M zones,

ii. displace said middle gimbal about said middle gimbal axis in the other direction so as to null said first control signal when the current values of I and M are in zones **(2)**, **(4)**, **(7)** and **(8)** of said predetermined I-M zones,

said middle axis motor and circuit being responsive to said second control signal to:

iii. displace said middle gimbal about said middle gimbal axis in a first direction so as to null said second control signal when the current values of I and M are in zones **(9)** and **(10)** of said predetermined I-M zones,

iv. displace said middle gimbal about said middle gimbal axis in the other direction so as to null said second control signal when the current values of I and M are in zones **(11)** and **(12)** of said predetermined I-M zones,

iv. an outer axis control means including:

a. said X-gyro, said Z-gyro, and said resolver,

b. means for generating a selected angle signal, E_c,

c. second generating means responsive to said selected angle signal and to the angular displacement, E, of said inner gimbal about said platform axis, for generating a third control signal proportional to:

$$\sin (E - E_c)$$

d. means for detecting the angular displacement, I, of said middle gimbal about said inner gimbal axis, and associated generating means for generating a fourth control signal proportional to:

$$\sin I$$

e. an outer axis motor means and associated control circuit, said outer axis motor means and circuit being responsive to said first control signal to:

i. displace said outer gimbal about said outer gimbal axis in a first direction so as to null said first control signal when the current values of I and M are in zones **(9)** and **(12)** of said predetermined I-M zones,

ii. displace said outer gimbal about said outer gimbal axis in the other direction so as to null said first

signal when the current values of I and M are in zones (10) and (11) of said predetermined I-M zones,

said outer axis motor and circuit being responsive to said third control signal to:

i. displace said outer gimbal about said outer gimbal axis in a first direction so as to null said third control signal when the current values of I and M are in zones (1) and (4) of said predetermined I-M zones,

ii. displace said outer gimbal about said outer gimbal axis in the other direction when the current values of I and M are in zones (2) and (3) of said predetermined I-M zones,

said outer axis motor and circuit being responsive to said fourth control signal to:

i. displace said outer gimbal about said outer gimbal axis in a first direction so as to null said fourth control signal when the current values of I and M are in zones (5) and (7) of said predetermined I-M zones, and

ii. displace said outer gimbal about said outer gimbal axis in the other direction so as to null said fourth control signal when the current values of I and M are in zones (6) and (8) of said predetermined I-M zones,

where said twelve predetermined I-M zones are defined to be:

Zone (1):	$[-a + 2\pi m] < I < [+b + 2\pi m]$ radians $[-q + 2\pi n] < M < [+r + 2\pi n]$ radians
Zone (2):	$[d + 2\pi m] < I < [-c + 2\pi(m + 1)]$ radians $[-q + 2\pi n] < M < [+r + 2\pi n]$ radians
Zone (3):	$[-a + 2\pi m] < I < [+b + 2\pi m]$ radians $[+t + 2\pi n] < M < [-s + 2\pi(n + 1)]$ radians
Zone (4):	$[+d + 2\pi m] < I < [-c + 2\pi(m + 1)]$ radians $[+t + 2\pi n] < M < [-s + 2\pi(n + 1)]$ radians
Zone (5):	$[-a + 2\pi m] < I < [+b + 2\pi m]$ radians $[+r + 2\pi n] < M < [+t + 2\pi n]$ radians
Zone (6):	$[-a + 2\pi m] < I < [+b + 2\pi m]$ radians $[-s + 2\pi n] < M < [-q + 2\pi n]$ radians
Zone (7):	$[+d + 2\pi m] < I < [-c + 2\pi(m + 1)]$ radians $[+r + 2\pi n] < M < [+t + 2\pi n]$ radians
Zone (8):	$[+d + 2\pi m] < I < [-c + 2\pi(m + 1)]$ radians $[-s + 2\pi n] < M < [-q + 2\pi n]$ radians
Zone (9):	$[-c + 2\pi m] < I < [-a + 2\pi m]$ radians $[-q + 2\pi n] < M < [+r + 2\pi n]$ radians
Zone (10):	$[+b + 2\pi m] < I < [+d + 2\pi m]$ radians $[-q + 2\pi n] < M < [+r + 2\pi n]$ radians
Zone (11):	$[-c + 2\pi m] < I < [-a + 2\pi m]$ radians $[+t + 2\pi n] < M < [-s + 2\pi(n + 1)]$ radians
Zone (12):	$[+b + 2\pi m] < I < [+d + 2\pi m]$ radians $[+t + 2\pi n] < M < [-s + 2\pi(n + 1)]$ radians

and m and n are integers, where a, b, q, and r are greater than or equal to zero and less than $\pi/2$ radians, and, c, d, s, and t are greater than $\pi/2$ radians and less than or equal to π radians.

4,052,655

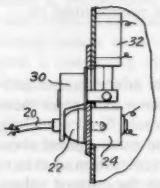
BATTERY RECHARGING METER

Joseph Vizza, 414 Broad Ave., Belle Vernon, Pa. 15012

Filed Sept. 10, 1975, Ser. No. 611,989

Int. Cl.[2] B65G 11/00

U.S. Cl. 320—2 **3 Claims**



1. A battery recharging meter stand for electric battery operated vehicles comprising a receptacle to which a battery recharging cable from a vehicle is to be connected, a timing device operated by flow of battery charging current to the cable to indicate the time during which such battery charging current has flowed, a register operated by the flow of current to the cable to indicate the cost per unit time times the number of units of time of flow of the battery charging current, means to lock said battery recharging cable from said vehicle to said receptacle, said last named means comprising a fork shaped slideable element to overlie a male connector of said cable, solenoid means, said means to lock being operatively connected to said solenoid means, means upon actuation of said slideable element for making the actual connection between the source of electricity and said cable so that the electrical connection is turned off when the locking means moves to the unlocked position.

4,052,656

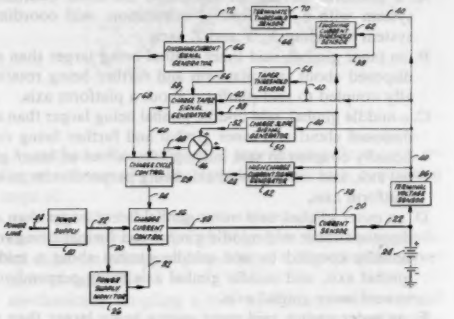
BATTERY CHARGING SYSTEM

Maurice Lavell, 2117 Larkwood St., West Covina, Calif. 91790, and Donald P. Wilson, 1005 Riviera Drive, Pasadena, Calif. 91107

Continuation-in-part of Ser. No. 462,752, April 22, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 604,615

Int. Cl.[2] H02J 7/04

U.S. Cl. 320—23 **17 Claims**



1. A method of charging a battery comprising the steps of:

sensing the charging current and terminal voltage of the battery, charging said battery with a relatively high and substantially constant current during a high current stage until said terminal voltage rises relatively rapidly indicating a transition phase;

tapering the charging current from the relatively high value to a pedetermined finishing current in a taper current stage, said tapering being at a rate which causes continual rise in said terminal voltage of said battery during said tapering;

monitoring the total charge delivered to said battery during said high and taper current stages;

further charging said battery with said finishing current for a time period based upon said total charge and thereafter terminating said charging of said battery.

4,052,657

DISTRIBUTION SYSTEM FOR A. C. ELECTRICAL ENERGY DERIVED FROM D. C. ENERGY SOURCES

Charles T. Kleiner, Fullerton, and Walter Hochwald, Downey, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 22, 1976, Ser. No. 679,271

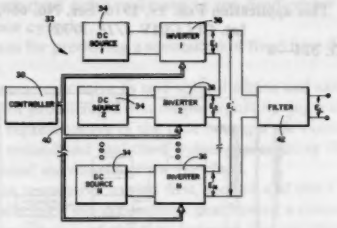
Int. Cl.[2] H02M 1/12

U.S. Cl. 363—43 **16 Claims**

1. Apparatus for distributing A.C. electrical energy to a load comprising:

inverter means responsive to gating signals for producing A.C. electrical energy having a waveform substantially that of a quasi-square wave; and

controller means for providing said gating signals to said inverter means to cause said quasi-square wave to approximate a sine wave in phase with and having the same amplitude as said quasi-square wave in that the time integral of the difference between said quasi-square wave and said sine wave is caused to be substantially zero in each time interval between successive instants in time when said sine wave and said quasi-square wave have the same value.

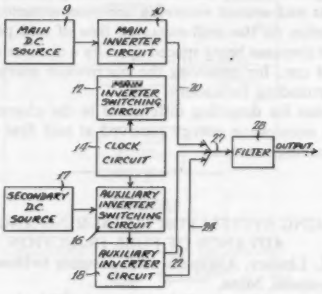


4,052,658

INVERTER CIRCUIT FOR PRODUCING SYNTHESIZED SINUSOIDAL WAVEFORMS

David J. Hucker, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 18, 1976, Ser. No. 733,106
Int. Cl.² H02M 1/12
U.S. Cl. 363—43 **12 Claims**



1. An inverter circuit for generating a synthesized sinusoidal output of a desired frequency comprising:

means for generating a first, a second and a third fundamental rectangular waveform at a desired frequency wherein each of the first, the second and the third rectangular waveforms is out of phase with the other two by 120°;

means for generating notched rectangular waveforms for each of the first, the second and the third fundamental waveforms;

a first means for combining the notched rectangular waveforms for each of the first, the second and the third fundamental waveforms to provide a single rectangular triplex waveform having a frequency equal to three times the frequency of the desired frequency; and

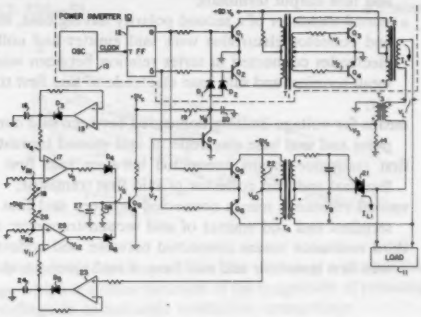
a second means for combining the first fundamental rectangular waveform, the notched rectangular waveforms for the first fundamental waveform and the single triplex waveform to provide the synthesized sinusoidal output in phase with the first fundamental waveform.

4,052,659

OVERLOAD PROTECTION SYSTEM FOR POWER INVERTER

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Satoshi Nagano, Long Beach, Calif.

Filed Nov. 15, 1976, Ser. No. 742,034
Int. Cl.² H02M 1/18
U.S. Cl. 363—57 **10 Claims**



1. An overload protection system for a power inverter comprising

means for producing a load signal proportional to current delivered by said inverter to a load,

first comparing means for comparing said load signal with a first predetermined reference level specifying the onset of an overload condition,

a signal inverter for producing a small monitoring current through said load,

means for producing a monitoring signal proportional to said monitoring current through said load,

second comparing means for comparing said monitoring signal with a second predetermined reference level specifying the continuation of an overload condition, and

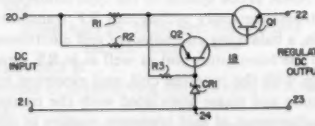
control means responsive to said first and second comparing means for shutting said power inverter off and turning said signal inverter on once said power signal exceeds said first predetermined reference level and thereafter while said monitoring signal exceeds said second predetermined reference level, and for shutting said signal inverter off and turning said power inverter on once said monitoring signal does not exceed said second predetermined reference level.

4,052,660

DC SERIES VOLTAGE REGULATOR WITH GATING MEANS FOR OUTPUT TO REMAIN OFF UNTIL REGULATION LEVEL IS REACHED

Kenneth C. Shuey, Cridersville, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 11, 1976, Ser. No. 713,560
Int. Cl.² G05F 3/08
U.S. Cl. 323—19 **2 Claims**



1. A series voltage regulator for producing a regulated direct output voltage from a direct input voltage that is subject to variation, said regulator comprising:

first and second input terminals for direct voltage application thereto;

first and second output terminals for supply of a regulated direct voltage thereat in response to voltage applied to said input terminals, said second input and second output terminals being directly connected to a common point;

a first transistor of a first polarity having base, emitter and collector electrodes with said emitter and collector electrodes connected in series relation between said first input and first output terminals;

a second transistor of a second polarity having base, emitter and collector electrodes with said emitter and collector electrodes connected in series relation between said first input terminal and said base electrode of said first transistor;

means for voltage limiting connected between said common point and said base electrode of said second transistor;

first resistance means connected between said first input terminal and said collector of said first transistor;

second resistance means connected between said first input terminal and said emitter of said second transistor; and

third resistance means connected between said collector of said first transistor and said base of said second transistor.

4,052,661

NUCLEAR MAGNETIC RESONANCE PROBE

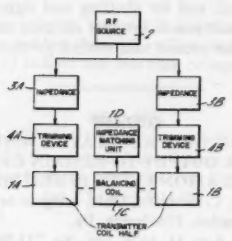
Peter Higham, High Wycombe, and Robert Alan Hoult, Beaconsfield, both of England, assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed May 13, 1976, Ser. No. 685,739

Claims priority, application United Kingdom, May 14, 1975, 20384/75

Int. Cl.² G01R *33/08*

U.S. Cl. 324—.5 R **12 Claims**



1. In an NMR probe system of the type comprising substantially electromagnetically orthogonal RF transmitter and receiver coils, a balancing coil adjacent and electromagnetically coupled to the transmitter coil as well as in RF signal transfer relationship with the receiver coil, and electrical trimmers of RF amplitude and phase associated with the transmitter coil, whereby adjustment of said trimmers enables in operation an RF voltage to be set up in the balancing coil that is of the correct phase and amplitude for substantially cancelling any spurious RF voltage in the receiver coil due to stray induction effects.

4,052,662

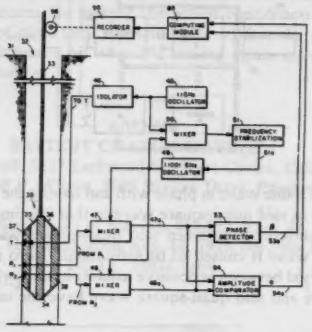
METHOD AND APPARATUS FOR INVESTIGATING EARTH FORMATIONS UTILIZING MICROWAVE ELECTROMAGNETIC ENERGY

Rama N. Rau, League City, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Division of Ser. No. 390,987, Aug. 23, 1973, Pat. No. 3,944,910. This application Feb. 19, 1976, Ser. No. 659,455

Int. Cl.² G01V *3/18, 3/12*

U.S. Cl. 324—6 **14 Claims**



1. Apparatus for investigating earth formations surrounding a borehole comprising:

a. a pad member adapted for engagement with the borehole wall;

b. means for generating microwave electromagnetic energy;

c. a transmitting antenna mounted on the wall-engaging face of said pad member for receiving said microwave electromagnetic energy and injecting said microwave electromagnetic energy into the surrounding formations;

d. first and second receiving antennas mounted in spaced relation on the wall-engaging face of said pad member, said antennas being spaced apart by a distance of the order of 4 cm., for receiving the microwave energy from the surrounding formations; and

e. means for detecting differences in the characteristics of the microwave energy received at said first and second receiving antennas.

4,052,663

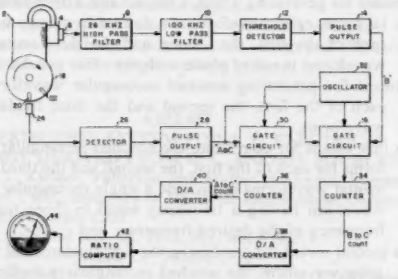
TIMING SYSTEM FOR MEASURING ANGLE OF ADVANCE OF FUEL INJECTION

Alfred L. Lindsey, Annapolis, Md., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 513,248, Oct. 9, 1974, abandoned. This application June 14, 1976, Ser. No. 695,912

Int. Cl.² G01R *13/42, 23/00, 29/00*

U.S. Cl. 324—16 R **10 Claims**



1. A fuel injection timing instrument for a fuel injected engine comprising

first means for producing a first timing signal corresponding to the occurrence of fuel injection into an engine reference cylinder,

second means for producing a second and a third timing pulse corresponding to the movement of a flywheel on the engine through a predetermined number of degrees between a first position and a second position, respectively, with said third pulse representing top-dead-center of the reference cylinder,

third means for producing a succession of fixed time division signals,

fourth means responsive to said second means and said third means for producing a first output signal having a characteristic representative of the time between the occurrence of said second and said third pulses representing the predetermined movement of the flywheel,

fifth means responsive to said first, second and third means for producing a second output signal having a characteristic representative of the time between the occurrence of the onset of the fuel injection into the engine reference cylinder and said second timing pulse, and

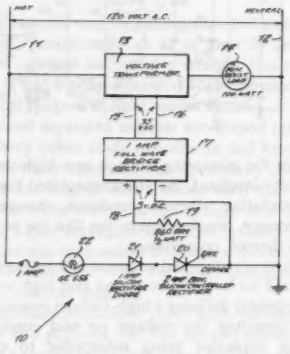
computing means for multiplying the ratio of said first and second output signals by a signal representative of the number of degrees on the flywheel between said first and second timing pulses to produce an output signal representative of a timing advance of the fuel injection onset before top-dead-center of the reference cylinder.

4,052,664

CIRCUIT MONITOR TO DETERMINE POWER ON AND CIRCUIT WORKING

Leonard Buster Pohl, P.O. Box 1661, Soldotna, Alaska 99669

Filed May 13, 1976, Ser. No. 686,060
Int. Cl.[2] G01R *31/02, 19/16*
U.S. Cl. 324—51 **4 Claims**



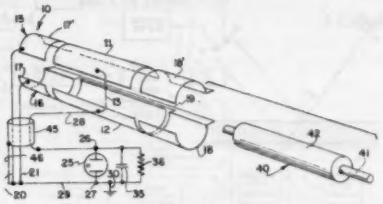
1. A circuit monitoring means, comprising an assembly of electrical components in an eletrical circuit including a voltage transformer having a primary, or high, voltage side and a secondary, or low, voltage side, a full wave rectifying means, a resistor, a gate controlled rectifier, a diode and a current sensing means wherein the primary side of said voltage transformer is connected in series with a circuit to be monitored, and the series connection consisting of the primary side of said transformer and the load to be monitored are connected across an alternating voltage source, and the secondary side of said transformer is connected to said full wave rectifying means and the positive output of said full wave rectifying means is connected through said resistor to the gate of said gate controlled rectifier and the negative side of said full wave rectifying means is connected to the neutral side of said alternating voltage source, and the said current sensing means, diode and gate controlled rectifier are connected in series between the primary side of said voltage transformer and the neutral side of said alternating voltage source.

4,052,665

CAPACITIVE PICKUP DEVICE FOR PULSATING HIGH VOLTAGE MEASUREMENTS

Clifford F. Gruenwald, Franksville, Wis., assignor to Snap-On Tools Corporation, Kenosha, Wis.

Filed Mar. 30, 1976, Ser. No. 672,257
Int. Cl.[2] G01R *31/12, 31/02, 19/16*
U.S. Cl. 324—54 **6 Claims**



1. A capacitive pickup device for deriving a measurable voltage which is a linear function of the magnitude of pulsating high voltage in an insulated conductor, comprising:

a pair of electrically conducting generally semicylindrical plate members connected together electrically to form a first plate element of a capacitor;

means mounting said plate members for relative movement so they selectively may open for receiving an insulated conductor without requiring conductor disconnection and close to form substantially a cylinder closely encircling the conductor, the conductor forming a second plate element of the capacitor and the insulation thereon forming the dielectric between the two plate elements;

a pair of electrically insulating members having concave faces respectively secured to the convex faces of said plate members and extending beyond the ends of said plate members;

a pair of electrically conducting generally semicylindrical plates respectively secured to the concave faces of said insulating members in spaced relation with said plate members, said plates centrally relieved to accommodate said plate members and adapted to be connected to ground, said plates functioning to minimize the fringing effects of extraneous electric fields on the voltage appearing on said plate members; and voltage limiting output means electrically connected between said plate members and said plates to provide high voltage protection to the user and associated apparatus and to form an output circuit for connection to apparatus for indicating in linear manner the magnitude of the high voltage in the conductor.

4,052,666

REMOTE SENSING OF VEGETATION AND SOIL USING MICROWAVE ELLIPSOMETRY

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Siegfried O. Auer, Lanham, and John B. Schutt, Silver Spring, both of Md.

Filed Apr. 15, 1976, Ser. No. 677,352
Int. Cl.[2] G01R *27/04*
U.S. Cl. 324—58.5 B **2 Claims**

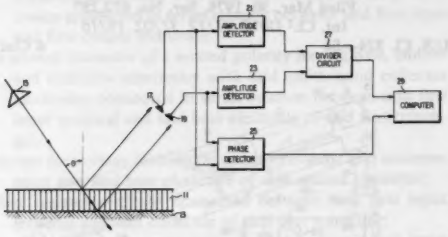
2. A method of determining the moisture of a soil substrate comprising:

transmitting a circularly polarized train of microwaves of wave length λ to a layer of soil substrates at a predetermined angle of incidence, the orthogonal components of the electric field of said microwaves having equal intensi-

ties I_r^p and I_r^s and in quadrature in the plane of incidence and normal to it;

receiving the orthogonal components of the train of microwaves reflected from the layer of vegetation and the soil substrate;

detecting the intensities I_r^p and I_r^s of the orthogonal components of the electric field of the received reflected train of microwaves;



determining the ratio I_r^p/I_r^s of the intensities of the detected orthogonal components of the electric field of the received reflected train of microwaves;

measuring the phase difference $90° + \Delta$ of the orthogonal components of the electric field of the received reflected train of microwaves; and

computing the refractive index n_m of the soil substrate from the formula

$$\frac{P_r^p}{P_r^s} e^{i\Delta} = \frac{r_m^p}{r_m^s}$$

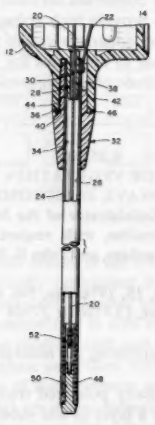
wherein r_m^p and r_m^s are the Fresnel coefficients for the orthogonal components and are a function of θ, λ, and n_m; and the refractive index of the soil n_m is given essentially by the moisture of the soil substrate.

4,052,667

MOISTURE METER CONSTRUCTION

Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.

Filed Sept. 8, 1976, Ser. No. 721,534
Int. Cl.² G01R 27/02
U.S. Cl. 324—65 P **3 Claims**



1. A moisture meter construction wherein a probe assembly is attached to a housing for the moisture meter, the improvement comprising:

a tubular extension formed upon said housing having an internal access opening providing access to the interior of the housing;

a first electrically conductive member tightly mounted upon said tubular section, said first electrically conductive member being tubular and having an elongated chamber therein;

said housing having an annular extension surrounding said tubular section and being spaced therefrom forming an annular internal chamber;

a plug member surrounding a portion of said first electrically conductive member with a portion of said plug member to tightly interfit within said internal chamber;

an insulator located within the outer end of said first electrically conductive member; and

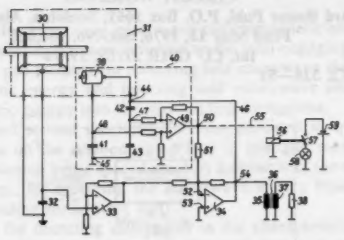
a second electrically conductive member being tightly mounted within said insulator.

4,052,668

ARRANGEMENT COMPRISING A HIGH VOLTAGE MEASURING CAPACITOR

Reinhold Schmitt; Hans-Joachim Freygang, and Panajotis Margaris, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 13, 1975, Ser. No. 558,175
Claims priority, application Germany, Mar. 20, 1974, 2413927
Int. Cl.² G01R 15/04, 5/00
U.S. Cl. 324—126 **6 Claims**



1. Apparatus for measuring voltage in a high-voltage conductor of a fully insulated, metal-encapsulated high voltage-switching installation wherein condition changes such as changes in pressure, temperature or the like can occur during the operation thereof, comprising:

a surface electrode disposed adjacent said high-voltage conductor, said surface electrode and said high-voltage conductor cojointly defining a high-voltage measuring capacitor for detecting the voltage on said conductor, said measuring capacitor being susceptible to capacitance variations because of said condition changes in said installation;

an auxiliary capacitor disposed within said high-voltage installation in the vicinity of said measuring capacitor and likewise susceptible to capacitance variations in response to said condition changes;

evaluation circuit means incorporating said auxiliary capacitor for detecting variations in the capacitance of said auxiliary capacitor caused by said condition changes and for generating a signal indicative of said capacitance variations of said auxiliary capacitor thereby providing an indication that the capacitance of said measuring capacitor has likewise undergone a variation because of said condition changes;

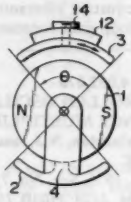
and compensating means responsive to said signal for varying the capacitance of said high voltage capacitor to compensate for the changes in capacitance of said high voltage capacitor caused by said condition changes.

4,052,669

LINEAR SCALE ELECTRIC METER WITH CYLINDRICAL INTERNAL MAGNET AND TWO ARC-SHAPED AUXILIARY YOKES

Susumu Yamaguchi, Kokubunji, Japan, assignor to Kizo Adachi, Tokyo, Japan

Filed Sept. 8, 1975, Ser. No. 611,417
Int. Cl.[2] G01R 5/06
U.S. Cl. 324—151 A 11 Claims



1. An electric meter providing a substantially linear scale, comprising:

a cylindrical internal magnet having a central axis and being diametrically magnetized so as to have N and S poles which are oriented such that a straight line connecting both said N and S poles intersects with said central axis of said internal magnet at right angles thereto.

first and second separated circular arc-shaped non-magnetized auxiliary yokes made of soft-iron and located opposite to each other about the outer periphery of said cylindrical internal magnet and oriented such that a straight line therebetween intersects the straight line connecting the N and S-pole arrangement of said cylindrical internal magnet, said non-magnetized auxiliary yokes being spaced a prescribed distance from the outer periphery of said cylindrical internal magnet,

said non-magnetized auxiliary yokes each having first and second tip end portions, the first tip end portions of said yokes being spaced from each other and being located on one side of a further straight line passing through the central portions of said yokes and said central axis of said cylindrical internal magnet, and the second tip end portions of said yokes being spaced from each other and being located on the other side of said further straight line,

a movable coil, and

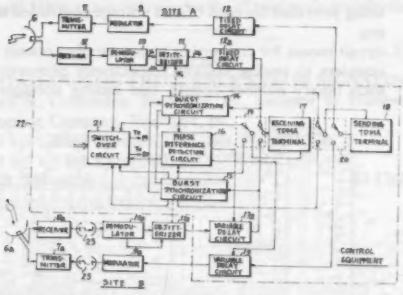
means for turnably supporting said movable coil so as to permit said movable coil to swing substantially in a yoke-free position in the spaces between said tip end portions of said non-magnetized auxiliary yokes about said central axis in a magnetic field produced in the space between said first tip end portions of said first and second non-magnetized auxiliary yokes and one pole of said cylindrical internal magnet and in the space between said second tip end portions of said first and second non-magnetized auxiliary yokes and the other pole of said cylindrical internal magnet.

4,052,670

SPACE DIVERSITY SYSTEM IN PCM-TDMA TELECOMMUNICATION SYSTEM USING STATIONARY COMMUNICATION SATELLITE

Tatsuo Watanabe, Mitaka; Hideki Saito, Tachikawa; Akira Ogawa, Machida, and Masahisa Yamaguchi, deceased, late of Tokyo, Japan, by Kazuko Yamaguchi, administrator and legal representative, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Filed Dec. 23, 1975, Ser. No. 643,708
Claims priority, application Japan, Dec. 24, 1974, 49-147601; Dec. 24, 1974, 49-147602
Int. Cl.[2] H04B 7/20
U.S. Cl. 325—4 3 Claims



1. A space diversity system with at least two signal routes in a PCM-TDMA telecommunication system utilizing a communication satellite generally stationary with respect to ground stations of the system, comprising;

signal conversion circuits each inserted in the receiving side of a respective one of said at least two signal routes for converting the received PCM signals of burst mode at each route into PCM signals synchronized with consecutive clock pulses of a respective ground station for each route,

phase difference detection means connected to said signal conversion circuits for establishing an arrival time difference between said PCM signals of said routes,

fixed delay circuits inserted in at least one of said signal routes for correcting a fixed delay difference between said routes,

variable delay circuits inserted in at least a remaining one of said signal routes and responsive to the output of said phase difference detection means for correcting the deviation of said arrival time difference between said PCM signals of said routes which occurs in accordance with any movement of said satellite, thereby equalizing respective electrical lengths of said routes to one another; and

switchover means connected to said signal routes for selecting one of said signal routes in accordance with the quality of the signals received at each route.

4,052,671

ADAPTIVE EQUALIZER

Julius Lange, Sunnyvale, Calif., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 26, 1976, Ser. No. 735,231
Int. Cl.[2] H04B 1/10
U.S. Cl. 325—42 4 Claims

1. An adaptive equalizer for improving the quality of digital data contained in an electrical input signal adapted to be supplied to said equalizer, said equalizer compensating for amplitude and delay distortion affecting the quality of the digital data contained in said electrical input signal and said equalizer comprising:

a. a delay line, said delay line being adapted to be supplied

with said electrical input signal, said delay line including a plurality of discrete time delay elements and a plurality of taps coupled to said time delay elements;

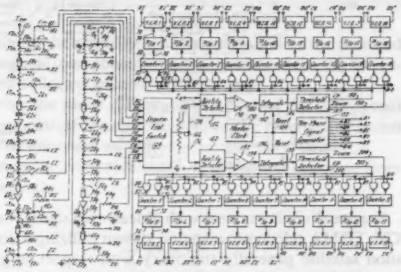
b. means for generating a plurality of electrical clock signals of identical frequency but different phase;

c. sequential switch means, coupled to said plurality of delay line taps, controlled by said clock signals, and having an output, for sequentially coupling said sequential switch means output to said delay line taps, thereby, to generate sequential-switch-means output signals;

d. a plurality of voltage controlled amplifiers, each of said voltage controlled amplifiers having an input coupled to one of said delay line taps, an output and a control-voltage input;

e. a plurality of binary number counters, one of said counters being provided for each of said voltage controlled amplifiers;

f. circuit means for converting binary number counts in said counters to analog voltage respectively proportional to such binary number counts, said analog voltages being



coupled to said control-voltage inputs of said voltage controlled amplifiers for which the respectively corresponding counters are provided, the gains of said voltage controlled amplifiers being functions of said analog voltages;

g. circuit means for summing signals appearing at said outputs of said voltage controlled amplifiers, thereby, to produce an adaptive equalizer output;

h. a quality detector circuit, coupled to said adaptive equalizer output, said quality detector circuit generating a sequence of quality detector output signals that vary as a function of the departure of the signal at said adaptive equalizer output from a rectangular waveform; and

i. logic circuit means for sequentially incrementing or decrementing said counters in response to said sequence of quality detector output signals, whereby, the gains of said voltage controlled amplifiers are sequentially altered in an adaptive or closed-loop manner to reduce the departure of the signal at said adaptive equalizer output from a rectangular waveform.

4,052,672

EXTENDED PHASE-RANGE, HIGH FIDELITY MODULATOR ARRANGEMENT

Ralph Thomas Enderby, Coral Springs; Francis Robert Steel, Parkland, and Alan Michael Victor, Cooper City, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed July 22, 1976, Ser. No. 707,747

Int. Cl.² H03C *3/06*

U.S. Cl. 325—147 **5 Claims**

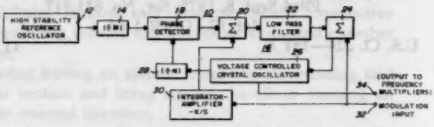
1. An extended range, high fidelity phase modulator including in combination:

a high stability reference oscillator:

a phase locked loop comprising at least a phase detector, a lowpass filter, a frequency divider and a voltage controlled oscillator, said phase locked loop having a predetermined gain constant and providing a differentiating action for applied modulation components;

means coupling said reference oscillator to said phase detector of said phase locked loop;

first modulation input means for applying modulation signal components to the input of said voltage controlled oscillator; and



second modulation input means for applying modified modulation signal components to said lowpass filter,

said second modulation input means including integrating means having a gain constant substantially the reciprocal of said phase locked loop gain constant.

4,052,673

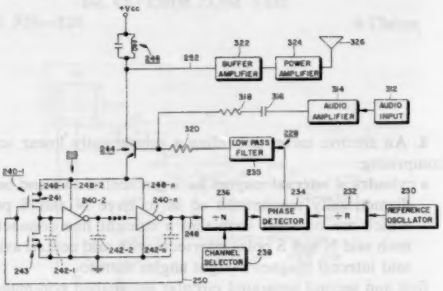
COMBINED CONTROLLED OSCILLATOR AND FREQUENCY MULTIPLIER

Gerald Bernard Herzog, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,802

Int. Cl.² H04B *1/04, 1/28;* **H03B** *19/10, 25/00*

U.S. Cl. 325—153 **14 Claims**



1. Apparatus comprising:

means for coupling a first signal having a frequency f_1 to a circuit point;

a number n of stages coupled in a cascaded configuration, said circuit point being an input to said cascaded configuration, each of said stages being, successively switched from a first state to a second state in response to said first signal each of said stages drawing power for a time duration shorter than the period of said first signal when it switches from one state to another;

said number n of power coupling means for providing power to respective ones of said stages;

a source of power;

impedance means coupled between each of said power coupling means and said source of power for developing a second signal having at least a frequency component at nf_1.

4,052,674

VHF TUNER DEVICE

Kunito Miyamoto, Kitano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

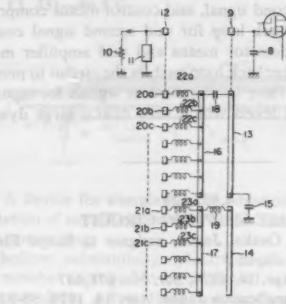
Filed July 11, 1972, Ser. No. 270,841

Int. Cl.² H04B *1/18*

U.S. Cl. 325—374 **3 Claims**

1. In a tuner device having an input circuit comprised of capacitive reactance means in parallel with an antenna radiation impedance, an antenna circuit having an amplifier with an

input electrode, and capacitive means between said electrode and a point of reference potential, and frequency selecting means connected between said input circuit and said amplifier circuit; the improvement wherein said frequency selecting means comprises first and second groups of inductors, means selectively connecting said input circuit to an end of each of said inductors, capacitor means having one terminal connected



to the other ends of said inductors of the group of inductors corresponding to the higher tuning frequencies, inductor means having one terminal connected to the other ends of the inductors of the group of inductors corresponding to the lower tuning frequencies, means selectively connecting the other terminals of said capacitor means and inductor means to said electrode, and a capacitor connected between the other terminal of said capacitor means and a point of reference potential.

4,052,675

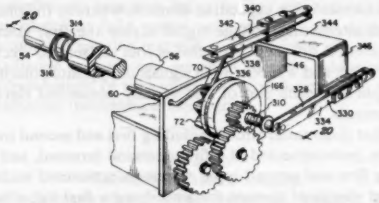
UHF TUNER ARRANGEMENT

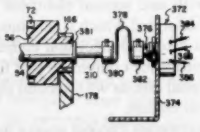
Alarico A. Valdettaro, Bloomington, Ind., assignor to Sarkes Tarzian, Inc., Bloomington, Ind.

Continuation of Ser. No. 600,288, July 31, 1975, abandoned, which is a division of Ser. No. 515,220, Oct. 16, 1974, Pat. No. 3,972,241, which is a division of Ser. No. 350,742, April 13, 1973, Pat. No. 3,842,683, which is a continuation of Ser. No. 174,722, Aug. 25, 1971, abandoned. This application Jan. 7, 1977, Ser. No. 757,672

Int. Cl.[2] H04B *1/06;* **H03J** *5/26*

U.S. Cl. 325—465 **12 Claims**





1. The combination of a UHF tuner having a continuously variable main tuning shaft rotation of which is effective selectively to receive signals on all channels in the UHF television band, a station selector shaft, gear means providing a step-down driving ratio on the order of **14:1** interconnecting said selector shaft and said main tuning shaft, detect means mounted directly on said selector shaft to establish a stop position of said main tuning shaft via said gear means for each of the television stations in the UHF television band, means for providing a unique indication of the channel to which the tuner is tuned, a vehicle impedance element electrically coupled to said UHF tuner, said variable impedance element being responsive to an electrical control signal for altering the tuning of said UHF tuner, a fine tuning shaft, and a control element mechanically coupled to said fine tuning shaft and responsive to the position of said fine tuning shaft for providing a control signal to said variable impedance element to effectively fine tune said UHF tuner independently of said main tuning shaft.

4,052,676

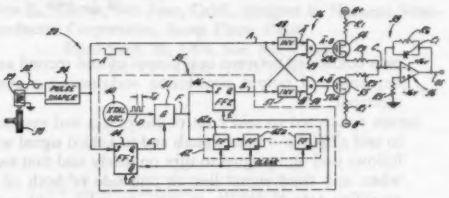
DIGITAL-ANALOG FREQUENCY ERROR SIGNALING

Bernard R. Crittenden, Rockford, Ill., assignor to Woodward Governor Company, Rockford, Ill.

Filed June 10, 1976, Ser. No. 694,770

Int. Cl.[2] H03D *3/02;* **G01R** *25/08*

U.S. Cl. 328—134 **23 Claims**



1. The method of producing a bipolar signal representing the analog of the error between a changeable frequency input signal and a set point frequency, comprising

a. generating a first recurring signal [A] with each recurrence having a duration which varies inversely with changes in the frequency of the input signal,

b. generating a second recurring signal [B] of constant predetermined duration, each cycle of such signal beginning substantially in synchronism with the start of each cycle of said first signal,

c. producing a first pulse of predetermined amplitude and of one polarity whenever and so long as the first signal exists without the presence of the second signal,

d. producing a second pulse of said predetermined amplitude and of the opposite polarity whenever and so long as the second signal exists without the presence of the first signal, and

e. producing an output analog signal which varies as the time average of the algebraic sum of said first and second pulses.

4,052,677

NON-LINEAR FUNCTION GENERATOR WITH SWITCHED CHANNELS

James A. Hogan, Hatfield, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sept. 29, 1976, Ser. No. 727,759

Int. Cl.[2] H03K *5/153;* **G06G** *7/12*

U.S. Cl. 328—143 **6 Claims**

1. Non-linear function generator apparatus comprising

an input connection arranged to receive an input signal,

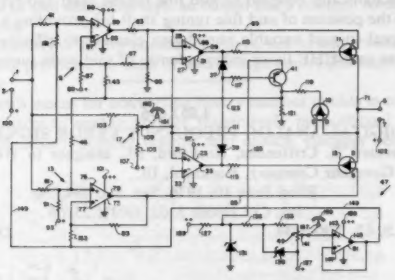
an output connection,

a first amplifier having an input connected to said input connection and to a source of a bias signal, and having an output in which said amplifier produces an output signal which follows said input signal with an offset determined by said bias signal,

a second amplifier having an input connected to said input connection and to said source of bias signal, and having an output in which said second amplifier produces an output signal which follows said input signal with an offset determined by said bias signal and of the opposite sense with respect to the first-mentioned offset,

a first semiconductor switch having a principle electrode path connected between said output of said first amplifier and said output connection and having a control electrode,

a second semiconductor switch having a principle electrode



path connected between said output of said second amplifier and said output connection and having a control electrode, and

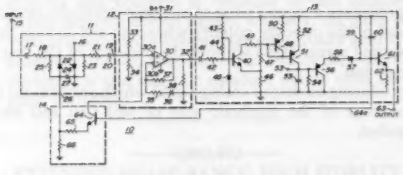
means connected to said control electrodes and responsive to said amplifier output signals and to a third signal which follows said input signal to turn on solely said first switch when said third signal lies on one side of both of said amplifier output signals, to turn on solely said second switch when said third signal lies on the opposite side of both of said amplifier output signals, and to apply said third signal to said output connection solely when said third signal lies between said amplifier output signals.

4,052,678

NOISE FLOOR INDICATIVE CIRCUIT

David Gordon Ramsland, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 14, 1975, Ser. No. 604,563
Int. Cl.[2] H03G *3/32*
U.S. Cl. 330—281 **8 Claims**



1. An improved circuit for providing a floor indicative signal for input signals having floor levels varying over a large dynamic range, comprising:

amplifier means having a controllable predetermined gain for receiving an input signal having a first floor level and producing an output signal having a second floor level, said second floor level being related to said first floor level by the gain of said amplifier means;

detector means coupled to said amplifier means for receiving said output signal and producing a floor level indicative signal related to said second floor level, said detector means including a peak level detection means for receiving said output signal and producing a first signal corresponding to the peak magnitudes of said output signal, and said detector means including a minimum level detection means for receiving said first signal and producing a second signal having a magnitude substantially corresponding to the minimum magnitude of said first signal, said second signal determining the magnitude of said floor level indicative signal; and

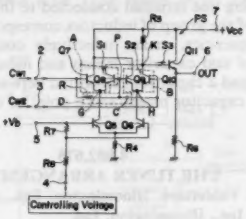
control means for inversely and nonlinearly varying the gain of said amplifier means directly in response to the magnitude of said second signal, said control means comprising a control feedback loop for said second signal coupled between said detector means and said amplifier means, whereby said feedback loop enables the circuit to produce corresponding floor level indicative signals for input signals with floor levels which vary over a large dynamic range.

4,052,679

PHASE SHIFTING CIRCUIT

Nobukazu Hosoya, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Apr. 14, 1976, Ser. No. 678,637
Claims priority, application Japan, Apr. 14, 1975, 50-931[U]
Int. Cl.[2] H03K *1/12*
U.S. Cl. 330—261 **4 Claims**



1. A phase shifting circuit for shifting the phase of an alternating signal applied to thereto said phase shifting circuit comprising:

a. a phase shifting means having two electrical elements connected in series, the phase characteristics of a first of the electrical elements being different from that of the second electrical element and wherein one of the electrical elements is a capacitive element, whereby the phase of said alternating voltage signal across the first electrical element is different from that across the second electrical element; and wherein input signals of opposite polarity are applied to each end of said serially connected electrical elements.

b. a first differential circuit including first and second transistors interconnected at a first common terminal, and having first and second input terminals connected with said first electrical element for amplifying a first signal which is obtained from the voltage drop across said first electrical element;

c. a second differential circuit including third and fourth transistors interconnected at a second common terminal, and having third and fourth input terminals connected with said second electrical element for amplifying a second signal which is obtained from the voltage drop across said second electrical element;

d. means for combining said first signal from said first differential circuit with second signal from said second differential circuit;

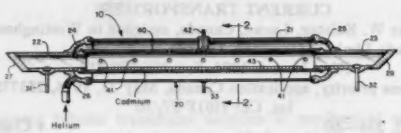
e. a constant current source means connected to each of said first common terminal and second common terminal, and connected to reference voltage point; and

f. means for controlling a conductivity of said constant current source.

4,052,680
METAL VAPOR LASER HAVING CATAPHORESIS MEANS

Shing Chung Wang, Temple City; Randolph W. Hamerdinger, Glendora, and William F. Hug, Pasadena, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed July 1, 1976, Ser. No. 701,476
Int. Cl.² H01S 3/22
U.S. Cl. 331—94.5 G **1 Claim**



1. A device for stimulating the emission of radiation by the excitation of metallic material from an initial state to an excited state comprising:

a hollow, substantially cylindrical, electrically conductive member arranged to be employed as a cathode;

an envelope, substantially surrounding said cathode and being disposed substantially coaxially therewith, having a substantially cylindrical, electrically conductive body section, and a pair of substantially nonconductive end sections extending, respectively, from each end of said body section, each of said end sections terminating in a radiation transmission member; said envelope being adapted to substantially enclose a quantity of gaseous material and a quantity of unvaporized metallic material;

an anode terminal, coupled to said body section, for passing electrical energy to said device for heating said cathode and causing said metallic material to vaporize, and for further causing said gaseous material and said metallic material to interact to raise said metallic material from an initial state to a vaporized excited state characterized by a positive electric charge;

a cathode terminal, coupled to said cathode, for providing an electrical return path from said cathode to a point of low potential; and

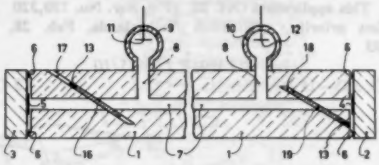
a pair of cataphoresis terminals, one of said cataphoresis terminals being disposed along one of said end sections in advance of one of said radiation transmission members, and the other of said cataphoresis terminals being disposed along the other of said end sections in advance of the other one of said radiation transmission members; said pair of cataphoresis terminals being further adapted to establish an electrical field within said envelope for urging said vaporized metallic material away from the nearest of said radiation transmission members, thereby minimizing the condensation of said vaporized metallic material on said radiation transmission members.

4,052,681
GAS-DISCHARGE LASER

Kornelis Bulthuis; Bram Johan Derksema; Hendrik Tjalling Dijkstra, and Johannes van de Wal, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 18, 1975, Ser. No. 642,069
Claims priority, application Netherlands, Mar. 13, 1975, 7502973
Int. Cl.² H01S 3/02
U.S. Cl. 331—94.5 D **3 Claims**

1. A gas-discharge laser which comprises: Means for creating a population inversion, a laser medium and means for stimulating the emission of a laser beam and a gas-discharge tube, part of said tube being an elongated laser tube, said laser tube having secured directly to the two ends thereof respective reflectors, at least one of said reflectors passing a coherent light beam, said laser further having in the laser tube, near at least one of the reflectors, a plane-parallel transparent plate constituting a Brewster window the normal to which makes an angle with the axis of the laser tube equal to the Brewster angle, said laser tube having a capillary bore, said Brewster window being secured with a major surface thereof substantially parallel to and engaging a slot in said laser tube, said slot being disposed

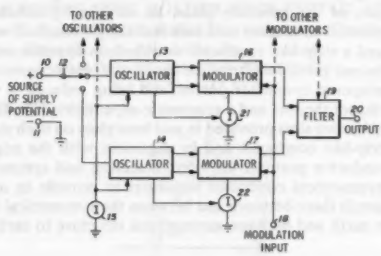


in oblique relationship to said axis of said laser tube and extends around at least a portion of said capillary bore, the normal to said surface of the tube making an angle equal to the Brewster angle with the axis of the laser tube.

4,052,682
MULTIPLE OSCILLATOR MODULATOR CIRCUIT

Milton E. Wilcox, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Sept. 20, 1976, Ser. No. 724,441
Int. Cl.² H03C 1/00, 3/00
U.S. Cl. 332—16 R **8 Claims**



1. A multiple oscillator modulator circuit suitable for construction in integrated circuit form and for generating one of a plurality of possible carrier signals and for impressing upon said one carrier a modulation signal wherein the switching of said one of said plurality of possible carrier signals is achieved without switching signal carrying currents, said circuit comprising:

means for coupling said circuit to a source of operating potential;

a plurality of oscillators;

switch means coupled between each oscillator of said plurality and said source of operating potential, said switch means operating to connect any single one of said plurality of oscillators at a time to said source of operating potential;

a plurality of modulators, one for each oscillator of said plurality of oscillators, said plurality of modulators being coupled in common to a modulating signal terminal adapted for coupling to a source of modulating signals, each of said modulators being coupled to an associated oscillator for the application of oscillator signal to said modulators, and each of said modulators including a separate source of current; and

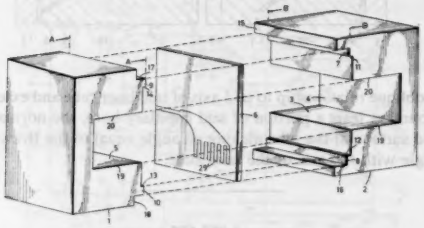
means for controlling said separate source of current in response to the current flowing in said associated oscillator whereby said modulator is turned off when said oscillator is not energized.

4,052,683

MICROWAVE DEVICE

Johannes Hendrik Cornelis van Heuven, and Frans Christiaan De Ronde, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 549,935, Feb. 14, 1975, abandoned.
This application Oct. 26, 1976, Ser. No. 735,320
Claims priority, application Netherlands, Feb. 28, 1974, 7402693
Int. Cl.² H01P 1/16, 5/10
U.S. Cl. 333—21 R 3 Claims



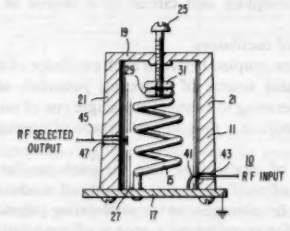
1. A microstrip to waveguide transition, comprising: a waveguide structure; a microstrip conductor structure including a substrate plate arranged in the longitudinal direction in the plane of symmetry and parallel to the electric field of the wave guide structure, an electrically balanced conductor structure including symmetrical conductor portions arranged on opposite sides of the substrate plate, an electrically unbalanced asymmetrical conductor structure including a conductive base plate and a strip-like conductor arranged on opposite sides of the substrate plate, said strip-like conductor being connected to the juxtaposed conductor portion and being reduced in width with respect thereto, and a symmetric-asymmetric transformer formed by two slots provided in said base plate on both sides of said strip-like conductor and in alignment with the edges of said conductor portions for interconnecting said symmetrical and asymmetrical conductor structures to provide an impedance match there-between and between the symmetrical structure to earth and between assymetrical structure to earth.

4,052,684

HELICAL RESONATOR

Peter Joseph Schmalz, Washington, Pa., assignor to RCA Corporation, New York, N.Y.

Filed July 6, 1976, Ser. No. 702,401
Int. Cl.² H01P 7/00
U.S. Cl. 333—82 R 2 Claims



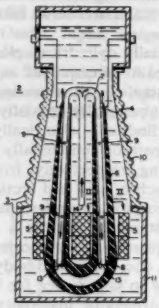
1. A helical resonator comprising:
a conductive enclosure,
a helical coil of conductive windings mounted at one end to one wall of said enclosure and extending toward an opposite wall of said enclosure,
a cylindrical conductive member formed at the free end of said coil and forming with said opposite wall a capacitor, said conductive member having a substantially reduced outside diameter with respect to the turn diameter of the coil, and
moveable conductive means electrically connected to and extending from said opposite wall of said enclosure into said cylindrical conductive member, said moveable conductive means being adjustable to vary the capacitance of said capacitor.

4,052,685

CURRENT TRANSFORMER

Tadeusz W. Kolator, Lucan, Canada, assignor to Westinghouse Canada Limited, Hamilton, Canada

Filed Nov. 4, 1976, Ser. No. 738,810
Claims priority, application Canada, May 31, 1976, 253775
Int. Cl.² H01F 27/10
U.S. Cl. 336—60 4 Claims



1. A current transformer, comprising:
an enclosure;
an insulating fluid disposed in said enclosure;
a winding disposed in said enclosure, said winding including a substantially vertical oriented U-shaped tubular conductor having upwardly extending legs with open ends;
means for increasing the circulation of said insulating fluid, including a fluid conductor disposed within said U-shaped tubular conductor to define first and second substantially coaxial flow paths for said insulating fluid, with the first path being within said fluid conductor, and the second path being between said fluid conductor and said tubular conductor;
said first and second flow paths being interconnected at a point within said winding;
said fluid conductor including first and second downwardly extending legs joined in common adjacent one of said open ends of said U-shaped conductor, said first leg disposed within one of said upwardly extending legs of said U-shaped conductor, said second leg extending downwardly into the cooler insulating fluid removed from said open end of said U-shaped conductor.

4,052,686

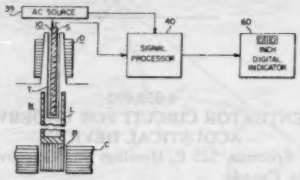
FLEXIBLE POSITION PROBE ASSEMBLY

Johannes J. Schmitz, Catonsville, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 16, 1975, Ser. No. 622,918
Int. Cl.² H01F 27/30
U.S. Cl. 336—65 3 Claims

1. A flexible probe assembly comprising a plurality of tubular transducer sections, an elongated flexible support member extending through said tubular transducer sections, said elongated flexible support member being a flat strip element which supports bending in two directions, the tubular passage through said tubular sections including grooves to accommodate said flat strip element such that said flat strip element

divides the tubular passage formed by said adjacent tubular transducer sections into two internal passages extending the length of said probe assembly, and means for maintaining



adjacent tubular transducer sections in mechanical contact, said means in combination with said elongated flexible support member permitting mechanical flexing of said probe assembly.

4,052,687

CIRCUIT BREAKER WITH PARALLEL SHORTING ELEMENT

Stephen F. Kimball, Georgetown, and Paul E. Gates, Danvers, both of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Sept. 12, 1975, Ser. No. 612,599
Int. Cl.² H01H *61/00*
U.S. Cl. 337—25 **2 Claims**

1. A circuit breaker comprising a sealed glass envelope having two lead-in wires extending therethrough, a thermally sensitive bimetal within said envelope mounted on one of said lead-in wires and making electrical connection to the other at room temperature but separated therefrom at a predetermined elevated temperature, and an electrically conductive bypass element within said envelope across said lead-in wires in parallel with said bimetal, wherein said bypass element can be melted by a short duration pulse of high electric current.

4,052,688

FUSE CLIP ASSEMBLY

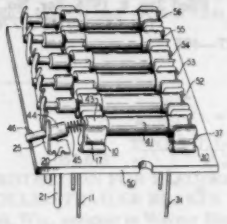
Ernest Gerard DeNigris, Colts Neck, and Albert John Tutko, Belle Mead, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J. and Western Electric Company, Inc., New York, N.Y.

Filed Sept. 27, 1976, Ser. No. 726,966
Int. Cl.² H01H *85/20*
U.S. Cl. 337—213 **11 Claims**

1. A fuse clip mounting board assembly for use with tubular alarm type fuses, said mounting board assembly having a load spring clip terminal, a line spring clip terminal, and an alarm terminal,

said load spring clip terminal including means for applying spring tension to a rear terminal of an inserted fuse, said spring tension being applied both perpendicularly to the body of said fuse and longitudinally along the axis of said fuse body,

said line spring clip terminal including means for applying spring tension to a front terminal of an inserted fuse, said spring tension being applied perpendicularly to the body of said fuse, said line spring clip terminal also including means for restricting the movement of said inserted fuse forward along said longitudinal axis, and



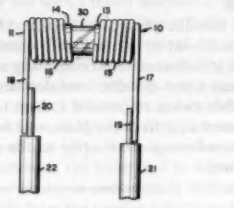
said alarm terminal including means for retaining an alarm contact extended axially from a front end of said fuse.

4,052,689

WIRE SPRING FUSE HOLDER WITH PIGTAIL LEADS

Dalton T. Smith, Sr., Meadville, Pa., assignor to Oneida Electronic Mfg. Co. Inc., Meadville, Pa.

Filed July 17, 1974, Ser. No. 489,091
Int. Cl.² H01H *85/50*
U.S. Cl. 337—215 **1 Claim**



1. A fuse and pigtail wire combination comprising,

a hollow cylindrical fuse body made of non-conducting material having a hollow cylindrical cuplike terminal made of conducting material and disposed on each end of said cylindrical body,

said terminal and pigtail being made of a single wire wound into a spiral,

each said pigtail wire having a first part and a second part integrally connected to said first part,

said first part being wound to form a tight coil on said cuplike terminal made of conductive material comprising a plurality of turns of slightly smaller internal diameter than the outside diameter of said cuplike terminals whereby said coil will grip the caps and make electrical contact with said caps disposed in the form of a hollow cylinder receiving a said cuplike terminal,

said second part comprising a straight section of wire disposed parallel to a diameter of said coil and extending diametrically across one end of said coil and terminating a substantial distance from said coil,

each said cuplike terminal member receiving an end of said hollow body,

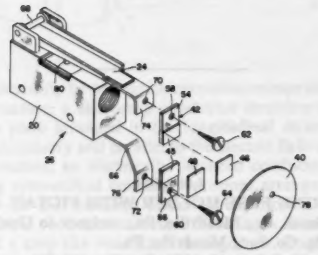
said second part of each said pigtail wire being soldered to a straight pigtail wire.

4,052,690

SENSITIVE FUSE FOR FIRE ALARM

Sidney Jacoby, Philadelphia, Pa., assignor to Evergard Fire Alarm Company, Inc., Philadelphia, Pa.

Filed Jan. 8, 1976, Ser. No. 647,330
Int. Cl.² H01H 37/76
U.S. Cl. 337—405 **11 Claims**



1. In a sensitive fuse for a heat responsive device, the combination of

a thin metallic plate to collect heat from the environment;

an attachment strip removably connected to the plate

said attachment strip comprising a non-ferrous metal strip and a non-metallic insulator laminated together; and

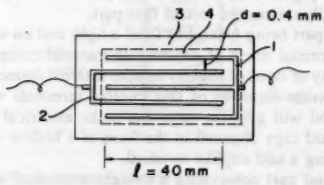
fusible means responsive to heat to disconnect the attachment strip from the plate, said fusible means affixing the non-ferrous metal strip to the plate in the absence of heat.

4,052,691

HUMIDITY SENSOR

Kentaro Nagano; Koji Nomaki, both of Yokohama; Yukinori Kutsukake, Tokyo, and Junji Nanao, Yokohama, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed May 14, 1976, Ser. No. 686,293
Int. Cl.² H01L 7/00
U.S. Cl. 338—35 **10 Claims**



1. A humidity sensor for detecting condensed moisture, which comprises:

a pair of spaced electrodes disposed on an insulating substrate;

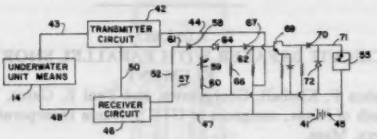
and a moisture sensitive membrane of an orthophosphate which at least partially covers the gap between said electrodes.

4,052,692

ACCENTUATOR CIRCUIT FOR UNDERWATER ACOUSTICAL DEVICES

Arthur W. Freeman, 525 E. Hastings St., Vancouver 4, British Columbia, Canada

Filed Nov. 24, 1975, Ser. No. 634,917
Int. Cl.² G01S 9/70
U.S. Cl. 340—3 R **13 Claims**



1. A circuit for an underwater device which detects the presence of an object in a body of water, comprising in combination:

underwater unit means for interchanging electrical signals and acoustical wave fronts in the water;

a transmitter circuit connected to said underwater unit means for transmitting an acoustical wave front through the water;

a receiver circuit connected to said underwater unit means for providing receiver outputs in accordance with the distances traversed by said reflected wave fronts;

the wave fronts reflecting from the bottom of the body of water producing a series of receiver outputs within a time interval thereby obliterating a receiver output which occurs within said time interval corresponding to an object under investigation;

a detector connected to the output of said receiver circuit to have a detector output of one polarity;

and an accentuator circuit including threshold means connected in series with said detector for modifying said receiver outputs to substantially reduce the obliteration due to said series of receiver outputs to resolve said receiver output corresponding to the wave front reflecting from the object under investigation from said wave fronts reflecting from the bottom of the body of water.

4,052,693

DEPTH SOUNDER

George A. Gilmour, Severna Park, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 3, 1976, Ser. No. 663,339
Int. Cl.² G01S 9/68
U.S. Cl. 340—3 R **12 Claims**

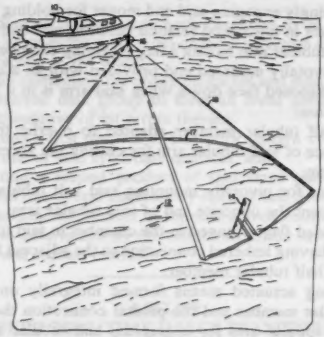
1. Depth sounding apparatus, comprising:

A. transducer means designed for operation over a target area;

B. means for periodically transmitting acoustic energy to impinge upon said target area;

C. means in cooperative association with said transducer means for forming, for each said transmission, a trans-

ducer beam which intersects said target area in an elongated curved area such that points in said intersection are



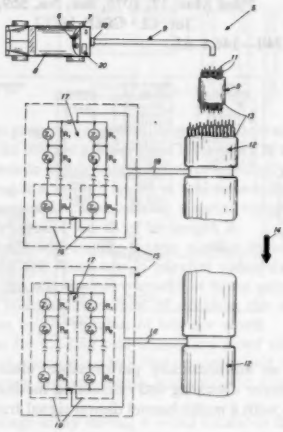
substantially equally distant from a predetermined point associated with said transducer means.

4,052,694

METHOD AND APPARATUS FOR DIAGNOSING FAULTS IN THE GEOPHONE GROUP OF A GEOPHYSICAL DATA ACQUISITION SYSTEM

Oke A. Fredriksson, Fullerton, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 16, 1975, Ser. No. 587,463
Int. Cl.[2] G01V *1/16;* **G01C** *27/00*
U.S. Cl. 340—17 R **10 Claims**



1. Apparatus for fault diagnosis of a geophone group within a geophone group-cable complex of a geophone data acquisition system which employs extensive series-parallel networks of geophones spread over the earth's surface and in which electrical signals from said groups must traverse along an extended geophone cable in order to be collected, detected and recorded, said apparatus looking electrically through said cable toward said group under test and yet compensating electrically for resistive effects of said cable to detect and possibly identify faults within said geophone group under test and among geophones within each group, comprising:

a. means for injecting into an input of said group-cable complex a DC current of predetermined amplitude,

b. means for injecting simultaneously into said input of said group-cable complex an AC current of peak absolute amplitude equal to said amplitude of said DC current, and

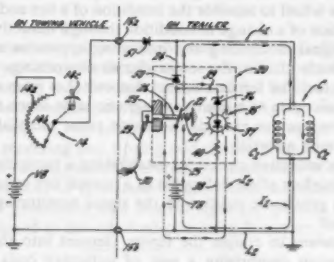
c. means for detecting and measuring excess of (i) peak voltage produced by injection of said AC current, over (ii) DC voltage generated by injection of said DC current at said input of said group-cable complex, said excess being a measure of a difference between AC and DC impedances of said geophone group under test independent of said cable through which said DC and AC currents are driven.

4,052,695

BREAKAWAY PROTECTION FOR ELECTRICALLY CONTROLLED TRAILER BRAKES

Philip E. Myers, Beloit, Wis., assignor to Warner Electric Brake & Clutch Company, South Beloit, Ill.

Filed Feb. 17, 1976, Ser. No. 658,459
Int. Cl.[2] B60T *7/20;* **H01H** *27/04*
U.S. Cl. 340—52 D **8 Claims**



1. A safety system for use with a trailer adapted to be removably hitched to a towing vehicle and having a brake which is engaged when an associated coil is energized by a battery carried by said trailer, said safety system including first and second separable parts which are normally connected to one another both when the trailer is hitched to and is intentionally unhitched from the towing vehicle, said first part being connected to the trailer, said second part being connected to the towing vehicle to remain with the latter and to separate from said first part when the trailer is accidentally unhitched but being manually releasable from the towing vehicle and capable of remaining connected to said first part when the trailer is intentionally unhitched, a switching device carried by said first part and physically actuated to a non-conductive state by virtue of being physically engaged by said second part when said parts are connected, said switching device being rendered conductive when said parts are separated, and means for connecting said switching device in a series path with said battery and said coil whereby current is supplied to said coil from said battery when said parts are separated and said switching device is conductive, the improvement in said safety system comprising:

a. a voltage indicator which responds only when the voltage applied thereto equals or exceeds a predetermined threshold value adequate to energize said coil, and

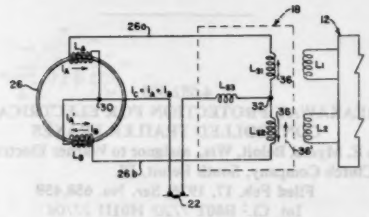
b. circuit connections placing said indicator electrically across said battery and said coil when said first and second parts are separated and said switching device is conductive,

whereby a user may manually separate said parts while the trailer is standing still and will be advised by the presence or absence of a response from said indicator that the battery is capable or incapable, respectively, of maintaining a predetermined value of voltage while the normally expected load current is drawn therefrom by said coil.

4,052,696
TIRE CONDITION MONITOR

Robert S. Enabnit, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 1, 1976, Ser. No. 662,763
Int. Cl.[2] B60C 23/02
U.S. Cl. 340—58 5 Claims



1. A condition sensing circuit adapted for mounting on a vehicle wheel to monitor the condition of a tire and provide an indication of a change in condition through inductive coupling with signal monitoring and indicating apparatus mounted on the vehicle chassis, the sensor circuit comprising:

A. a toroidal ferrite element that switches from a ferromagnetic state to a nonferromagnetic state when the element temperature exceeds the Curie point established for the ferrite material;

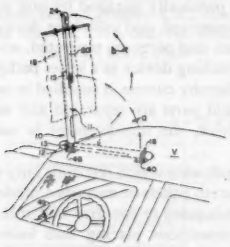
B. an inductive circuit for establishing a particular inductive coupling effect indicative of a normal tire condition when in proximate position to the signal monitoring apparatus; and

C. means to couple the ferrite element into the inductive circuit comprising a pair of inductive coils wound on opposite halves of the toroid element and forming parallel branch circuits such that current flow in one of the branches is reversed when the element switches to a nonferromagnetic state due to a temperature above the Curie point, said current reversal effectively altering the particular inductive coupling effect for an abnormal tire condition indication.

4,052,697
EMERGENCY BLINKER AND FLAG DISPLAY

Theodore Steven Daifotes, P.O. Box 383, Tuolumne, Calif. 95379

Filed Jan. 6, 1977, Ser. No. 757,456
Int. Cl.[2] B60Q 1/00
U.S. Cl. 340—87 7 Claims



1. For an automotive vehicle an emergency warning signal comprising:

1. a mounting block and an end mount adapted to be secured in spaced horizontal relation on the body of such a vehicle;

2. A spring-loaded tubular arm having one end pivotally mounted on said mounting block and normally tending to swing in a plane toward vertical position away from said end mount;

3. a latch means at the opposite end of said tubular arm for latchingly engaging said end mount for holding said tubular arm in horizontal relation between said end mounts;

4. said tubular arm having a flag receiving chamber adjacent its pivotally mounted end provided with an access opening disposed face down when said arm is in a horizontal position;

5. a half tubular member adapted to overlie the bottom surface of said tubular arm for closing the access opening therein;

6. means for pivotally mounting said half tubular member adjacent the opposite end of said tubular arm;

7. a folded flag arranged in the chamber in said tubular arm and having tethered connection to the adjacent free end of said half tubular member;

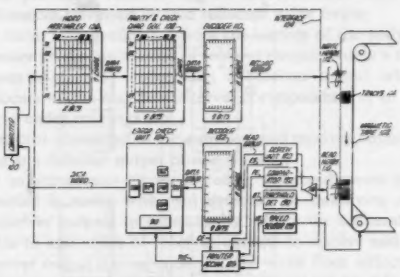
8. spring actuated means formed integrally on said half tubular member and the pivotal connection thereof with said tubular arm for urging the half tubular member in jack-knife fashion away from said spring-loaded tubular arm toward extended aligned relation thereto as the latter swings toward vertical position to thereby withdraw from the chamber thereof said flag for unfolded display at the upper free end of said half tubular member; and

9. release means in the opposite end of said tubular arm operatively engageable with said latch means for releasing said arm from said end mount.

4,052,698
MULTI-PARALLEL-CHANNEL ERROR CHECKING

Herbert U. Ragle, Thousand Oaks, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Mar. 17, 1975, Ser. No. 559,048
Int. Cl.[2] G06F 11/12
U.S. Cl. 340—146.1 AL 12 Claims



1. In an automatically performable, electronically implemented error checking and correcting method for use in conjunction with a multichannel digital signal transfer system, the steps of:

assembling the digital signals which are to be transferred into a plurality of multicharacter data words of common character bit length arranged so that each character is in a cross-channel direction with like bits of different characters in respective channels;

generating a check character having said common character bit length in response to the bits contained in each data word to be transferred using a cyclical code chosen so that the resulting check character can be logically combined with its respective data word to provide a representation of single bit errors as a set of unique ordered syndrome matrices, one for each channel, said matrices being related to each other in a manner such that the product resulting from the multiplication of a vector by one matrix is equal to the product of the same vector and the next higher order matrix shifted in a predetermined direction, each syndrome matrix containing a plurality of different error

patterns respectively corresponding to single bit errors occuring in particular bit positions of the respective channel;

appending each generated check character to its respective data word in the same cross-channel direction as the other characters in the word;

logically combining the check character and data word of a transferred data group to form an error pattern vector representative of bit errors therein;

generating a first product of said error pattern vector and a first one of said syndrome matrices; and

generating a second product of said error pattern and a second one of said matrices by shifting said first product a predetermined number of times in a predetermined direction as determined by the difference in the orders of said first and second matrices.

4,052,699

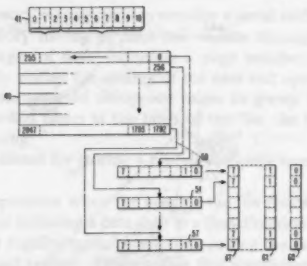
HIGH SPEED REAL TIME IMAGE TRANSFORMATION

William Frank Micka, Binghamton, N.Y., and Thomas Scott Robinson, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,433

Int. Cl.² G06K *9/00*

U.S. Cl. 340—146.3 MA **6 Claims**



1. In an image processing system, apparatus for transforming an *nxn*, *n* being an integer greater than 1, bit array of a horizontally oriented words of bit length *n* into *n* vertically oriented words of bit length *n* at high speed in real time comprising:

deserializer means for deserializing a serial video input bit stream into parallel words of bit length *n;*

temporary word addressable matrix storage means having *nm* locations for receiving in parallel video data words where *n* is the number of rows and *m* is the number of of words in a row as determined by dividing the number of bits per scan by the number of bits per word;

control means for loading said temporary word addressable storage means according to a first sequence and unloading said temporary storage means according to a second sequence;

an *nxn* bit storage array having *n* word locations for receiving *n* horizontally oriented words unloaded in parallel from said temporary storage means and outputting *n* vertically oriented words each composed of all bits from corresponding bit positions in each of said horizontally oriented words in said *nxn* bit storage array.

4,052,700

REMOTE CONTROL RECEIVER

Lembit Soobik, Kranzberg, Germany, and Horst Leuschner, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

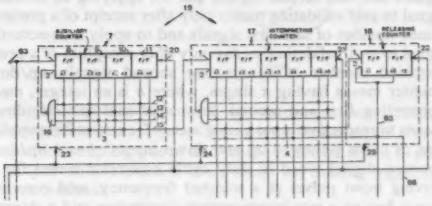
Filed Apr. 30, 1976, Ser. No. 681,949

Claims priority, application Germany, May 23, 1975, 2522920

Int. Cl.² H04B *1/06*

U.S. Cl. 340—171 PF **8 Claims**

1. A remote control receiver for the reception of command signals of different operating frequencies in individual channels, said receiver having a plurality of control outputs, each output assigned to an individual one of said channels, comprising operating frequency counter means for counting in each cycle of a repetitive sequence of counting cycles, received operating frequency command signals for production of an output signal upon the attainment of a predetermined count; reference frequency counter means controllable by the output signal of said operating frequency counter means for counting reference frequency signals in each said counting cycle of the operating frequency counter means; storage means for storing a reference frequency counter count reached in a said counting



cycle; comparator circuit means for comparing after each counting cycle the reference frequency counter count with the count stored by said storage means and for producing, as a result of said comparison, a signal indicating agreement or non-agreement of said compared counts; and error register means for receiving and storing said signals produced by said comparator means to produce, upon the attainment of a predetermined number of consecutive agreements, an enabling signal for the generation of a control signal at the said control output assigned to the received operating frequency.

4,052,701

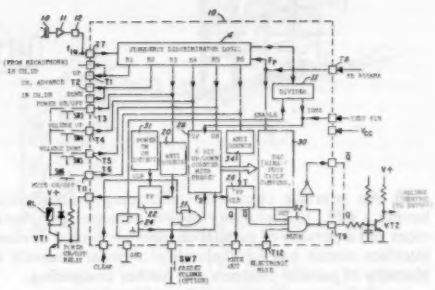
LOW COST REMOTE CONTROL RECEIVER

Horst Leuschner, Munich, Germany, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 30, 1976, Ser. No. 681,882

Int. Cl.² H04Q *9/12*

U.S. Cl. 340—171 R **17 Claims**



1. Remote control receiver for receiving continuous wave command signal pulses of different operating frequencies in individual signal channels with a selected frequency range, said receiver having an individual output for each said signal channel, means for dividing the frequency of received command signal pulses by a predetermined factor to produce sequence control pulses; sequence generator means responsive to each sequence control pulse resulting from reception of a command signal within the selected frequency range to initiate a new counting cycle; reference frequency counter means for counting reference frequency pulses in each of said counting cycles; said command signal pulses in each channel giving rise to a different predetermined count of said reference frequency counter means during a counting cycle; storage means for storing the count of the reference frequency counter reached

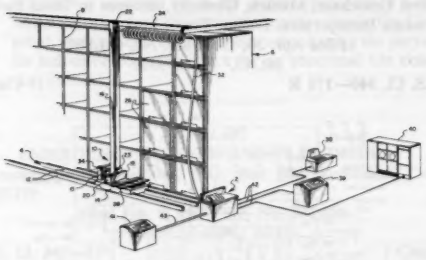
during a counting cycle; comparator circuit means for comparing at the end of each said counting cycle the count of said reference frequency counter means with the existing count stored by said storage means and for producing a first signal indicating identity between such counts and a second signal indicating non-identity between said counts; decoder circuit means connecting for receiving the count of said storage means to generate an output signal at an output of said receiver determined by said count; validation means selectively actuable to transfer the count of said storage means to said decoder circuit means; control circuit means connected for receiving said first signals and said second signals and for applying an actuating signal to said validating means only after receipt of a predetermined number of said first signals and to apply a de-actuating signal to said validation means only after reception of a predetermined number of consecutive second signals; up/down counter means having *n* stages, where *n* is an integer, means connecting first and second outputs of said decoder circuit means to respective input gating means for controlling application of clock pulses to up and down inputs of said up/down counter; digital word to duty cycle converter means for receiving input pulses at a selected frequency, said converter means having *n* rate inputs, means connecting said *n* stages of said up/down counter means to respective ones of said *n* rate inputs to apply a digit word thereto to control the output duty cycle of said converter means as a function of the count of said up/down counter means.

4,052,702

CIRCUIT FOR INTERFACING MICROCOMPUTER TO PERIPHERAL DEVICES

Kay D. Smith, Salt Lake City; Arjun S. Bachass, Kaysville, and Francis B. Black, Sandy, all of Utah, assignors to Kenway Incorporated, Bountiful, Utah

Filed May 10, 1976, Ser. No. 684,616
Int. Cl.[2] G06F *3/00, 5/04*
U.S. Cl. 364—200 **19 Claims**



10. An interface circuit for interfacing a microcomputer having a CPU to a plurality of serial-channel peripheral devices and a purality of parallel-channel peripheral devices, the interface circuit having a plurality of serial channels and a plurality of parallel channels and further comprising:

means for generating a plurality of baud rates;

an interface adaptor for each serial channel, the interface adaptor comprising means for receiving both output data and control data from the CPU in parallel format, said adaptor further comprising means for converting parallel format data to serial format data, and a clock generator electrically connected to said converting means, the clock generator gating serial format data through the converting means onto a selected serial channel at a preselected baud rate;

a baud rate selection register;

means for transmitting baud rate selection data from the CPU to the baud rate selection register;

multiplexing means electrically connected to the baud rate generating means, baud rate selection register, and the clock generator, said multiplexing means responding to the data in the baud rate selection register so as to transmit a selected one of the plurality of generated baud rates to the clock generator, thereby driving the clock generator at the selected baud rate;

a parallel channel adaptor comprising means for receiving both output data and control data from the CPU in parallel format, said adaptor further comprising gating means electrically connected to said receiving means for gating parallel format data onto a selected parallel channel;

means for communicating output data from the CPU to each adaptor; and

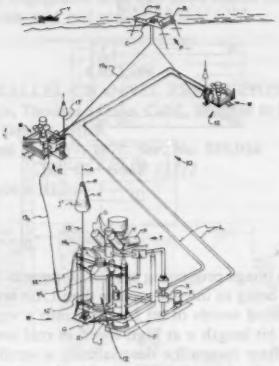
means for communicating control data from the CPU to each adaptor, said control data comprising a preselected combination of address signals which will enable the data receiving means of only one adaptor at a time to receive output data from the CPU.

4,052,703

INTELLIGENT MULTIPLEX SYSTEM FOR SUBSURFACE WELLS

Jerry Alan Collins, Sr., and Robert Lynn Spaw, both of Houston, Tex., assignors to Automatic Terminal Information Systems, Inc., Houston, Tex.

Filed May 5, 1975, Ser. No. 574,519
Int. Cl.[2] E21B *7/12*
U.S. Cl. 364—200 **11 Claims**



1. A system for operating and controlling a plurality of subsurface wells and well control equipment from a remote surface control location comprising:

a. subsurface control and monitoring means including subsurface signal receiving means, subsurface signal generating means, subsurface signal transmitting means, and subsurface programmable logic control means for receiving signals from a remote surface control location, for generating monitor signals at subsurface well locations, and for transmitting said generated signals from said subsurface well locations according to a preprogrammed logical sequence independent of the receipt of surface generated signals from a remote surface control location; and

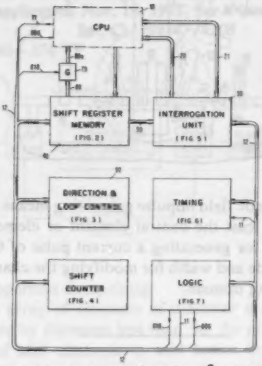
b. surface control and monitoring means including primary power source means, surface signal receiving means, surface signal generating means, surface signal transmitting means, and surface programmable logic control means for receiving signals from a plurality of said subsurface control and monitoring means and from external surface signal sources, for generating surface signals for controlling and monitoring a plurality of said subsurface control and monitoring means, for transmitting said generated surface signals from a remote surface control location to a plurality of said subsurface control and monitoring means and for generating surface control signals in response to a preprogrammed logical sequence and in response to signals received from external surface signal sources.

4,052,704

APPARATUS FOR REORDERING THE SEQUENCE OF DATA STORED IN A SERIAL MEMORY

Peter Anthony Franaszek, Ossining, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,752
Int. Cl.[2] G06F *7/04;* G11C *19/00*
U.S. Cl. 364—900 **8 Claims**



1. In a memory management system for a serial shift register type of memory having at least one station through which successive pages of date, including a page number, may be bidirectionally shifted for sensing of the data and operative to reorder the sequence of the stored pages to group the most recently accessed pages at the head of the file, the improvement comprising:

a. register means for storing a plurality of page numbers for search;

b. means operative when the head of the file resides at said station for initiating a data shift in a first direction through said shift register memory and for marking the page numbers in said register means with a first significant indicia;

c. means operative to compare said stored page numbers with each of the page numbers as they are shifted in either direction through said station and producing an equality signal upon a match;

d. means operative responsive to said equality signal for replacing the matching page number in said register and marking the replacement with a second significant indicia;

e. means operative responsive to the presence of all said second indicia in said register for reversing the direction of search;

f. means operative responsive to each of said equality signals for diverting the pages in said shift register memory whose page numbers matched those in said register means from a main shifting path into a parking means; and

g. means operative to reinsert the parked pages from said parking means into the main shifting path when the head of the file is proximate said station.

4,052,705

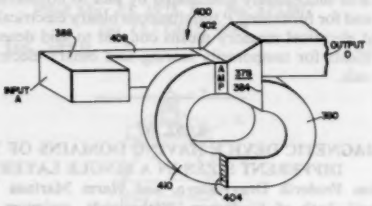
MEMORY DEVICE FOR TWO-DIMENSIONAL RADIANT ENERGY ARRAY COMPUTERS

David H. Schaefer, Silver Spring, and James P. Strong, III, Upper Marlboro, both of Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Division of Ser. No. 468,614, May 8, 1974, Pat. No. 3,996,455.
This application Feb. 13, 1976, Ser. No. 657,996
Int. Cl.[2] G11C *13/04, 11/42*
U.S. Cl. 340—173 LM **11 Claims**

1. A memory device for storing the digital information in an input array of radiant energy digital signals characterized by ordered rows and columns comprising:

radiant energy logic means having a pair of input surface locations for receiving a pair of separate radiant energy



digital signal arrays and an output surface location adapted to transmit a radiant energy digital signal array;

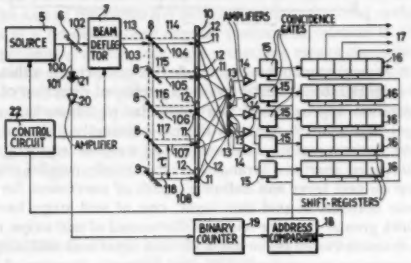
means for coupling one of said input surface locations to said output surface location in a manner for causing regenerative feedback.

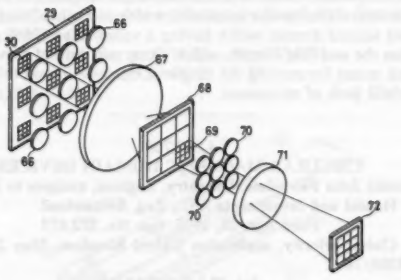
4,052,706

SYSTEM FOR READING AN OPTICAL RECORDING OF BINARY NUMERICAL DATA

Erich Spitz; Luigi d'Auria, and Jean-Pierre Huignard, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Nov. 26, 1975, Ser. No. 635,773
Claims priority, application France, Nov. 26, 1974, 74.38734
Int. Cl.[2] G11C *13/04, 8/00*
U.S. Cl. 340—173 LM **13 Claims**





1. A system for reading optical recording of binary numerical data, said recording being composed of at least one group of M (M being greater than 1) storage areas, each of said storage areas being adapted for projecting, into a detection plane, radiation corresponding to the image of P bits 0 and 1 (P being greater than 1), said system comprising:

a spatially coherent radiation source functioning by pulses for delivering an incident reading beam;

delay action dividing optical means ensuring the splitting up of said incident reading beam into an assembly of M collateral beams which are respectively directed towards said M storage areas, each pulse emitted by said radiation

source being subdivided by said dividing optical means in order to successively illuminate said M storage areas;

an assembly of P photoelectric detector elements located in said detection plane adapted for simultaneously detecting said P bits in said image projected by each of said storage area successively illuminated by said M collateral beams, and for furnishing P simultaneous binary electrical signals;

and electrical memory means coupled to said detector elements for temporarily storing said binary electrical signals.

4,052,707

MAGNETIC DEVICE HAVING DOMAINS OF TWO DIFFERENT SIZES IN A SINGLE LAYER

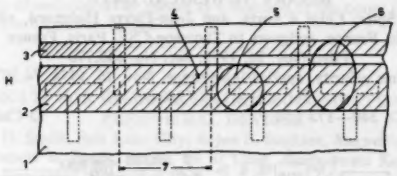
Willem Frederik Druyvesteyn, and Harm Marinus Wilhelm Booij, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 512,686, Oct. 7, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 666,654

Claims priority, application Netherlands, Oct. 6, 1973, 7313755

Int. Cl.² G11C *19/08*

U.S. Cl. 340—174 TF **9 Claims**



1. A magnetic bubble domain device comprising, a thin layer of magnetizable material having a preferred direction of magnetization approximately perpendicular to the surface of the layer and adapted to retain therein adjacently disposed magnetic domain regions, first and second strips of magnetic material spaced apart and arranged in substantially parallel relationship on said layer and defining a path of movement for magnetic domains in said thin layer, one of said strips having a width greater than the width of the second of said strips, means in cooperative engagement with said layer and said strips for maintaining successively arranged magnetic domains of a first size correlated to the width of said wider strip and of a second size correlated to the combined width of both of said strips, said second domain width having a value 15 to 125% greater than the said first domain width, along said path of movement, and means for moving the magnetic domains in said thin layer in said path of movement.

4,052,708

CIRCULAR MAGNETIC DOMAIN DEVICES

Russel John Fairholme, Daventry, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

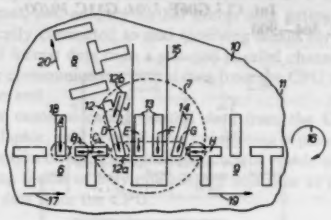
Filed Apr. 29, 1975, Ser. No. 572,875

Claims priority, application United Kingdom, May 2, 1974, 19205/74

Int. Cl.² G11C *19/08*

U.S. Cl. 340—174 TF **14 Claims**

1. A cylindrical magnetic domain device which includes a layer of uniaxial magnetic material having a unique easy magnetization direction substantially normal to a major surface thereof; generating means for generating cylindrical magnetic domains within the said layer; propagation means which define at least three propagation paths in which the generated cylindrical magnetic domains can be caused to propagate; and switching means for effecting the transfer of the propagating cylindrical magnetic domains from one of the said propagation paths to at least another one of the said propagation paths, the switching means including at least three magnetically permeable elements formed on the said major surface and orientated relative to each other and the propagation paths in a manner such that expansion of the propagating cylindrical magnetic domains in the direction of domain propagation can be effected, and magnetic field impulse generating means positioned to encompass at least the central element or elements of the switching means for generating a current pulse of the desired polarity, amplitude and width for modifying the characteristics of the propagating domain.



4,052,709

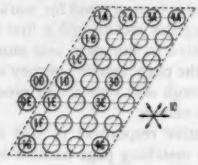
ACCESSING INFORMATION IN A LATTICE ARRAY BY DISLOCATION PUNCHING

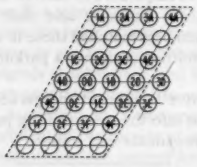
Praveen Chaudhari, Briarcliff Manor, and Geoffrey Richard Woolhouse, Montrose, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 27, 1975, Ser. No. 608,366

Int. Cl.² G11C *11/02*

U.S. Cl. 340—174 TF **12 Claims**





1. A method of accessing and moving at least a columnar portion of information from a magnetic bubble domain lattice array arranged in rows and columns and having a substantially perfect geometrical order, comprising:

a. establishing an elongated dislocation in the lattice array at the same row height as the desired columnar portion, and

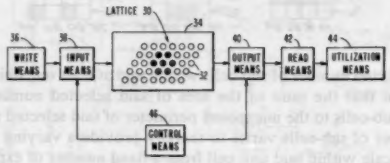
b. propagating the dislocation across the array toward the desired columnar portion to thus displace the corresponding columnar portions of each column by one column in the direction of propagation and expel the corresponding columnar portion of the last column in the direction of propagation from the array.

4,052,710

SYSTEMS USING LATTICE ARRAYS OF INTERACTIVE ELEMENTS

Bertram A. Calhoun, Saratoga, Calif.; John C. Slonczewski, Katonah, N.Y., and Otto Voegeli, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 395,336, Sept. 7, 1973, abandoned. This application Nov. 14, 1975, Ser. No. 632,604
Int. Cl.[2] G11C *19/08*
U.S. Cl. 340—174 TF 78 Claims



1. An apparatus comprising:

a lattice array of elements of diameter d spaced from one another by distances less than 3d, the positions and spacings of said elements in said lattice being substantially determined by interactions between said elements,

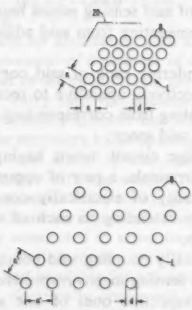
access means for accessing selected elements within said array.

4,052,711

BUBBLE LATTICE FILE USING MOVABLE FIXED LATTICE

Yeong S. Lin, Mount Kisco, and Jackson E. Stanland, Somers, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1974, Ser. No. 537,798
Int. Cl.[2] G11C *19/08*
U.S. Cl. 340—174 TF 31 Claims



16. A method for reading information represented by coded interactive elements in a lattice of such elements, said method including the steps of

expanding the equilibrium spacing between the elements in said lattice to relax said lattice while maintaining the same number of elements in said lattice, and

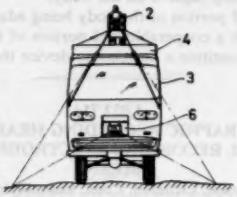
detecting the information represented by said coded interactive elements after said lattice is relaxed.

4,052,712

APPARATUS FOR PHOTOGRAPHING ROAD RUTS

Masanori Ohama, Machida, and Yutaka Nakada, Soka, both of Japan, assignors to Pacific Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 13, 1975, Ser. No. 577,007
Int. Cl.[2] G01D *9/42*
U.S. Cl. 346—107 R 3 Claims



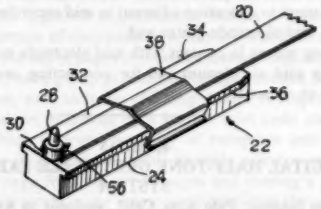
1. Apparatus for photographing a road surface to evaluate the presence of ruts therein, said apparatus comprising a vehicle adapted for traveling along a road whose surface is to be evaluated for ruts, light projecting means on said vehicle for projecting a beam of light on the road surface to form a linear boundary between an illuminated and a non-illuminated portion of the road extending transversely thereof, said light projecting means being oriented on said vehicle to direct said beam of light onto said road at an acute angle thereto and camera means on said vehicle for photographing said boundary, said camera means being mounted on said vehicle such that the axis of the camera is perpendicular to the road surface and is at a predetermined angular position in relation to said light projecting means, said light projecting means comprising a light source including a flash lamp, a condensor lens in front of said flash lamp, a projection lens in front of said condensor lens and a shading plate interposed between said condensor lens and said projection lens, said shading plate including one portion opaque to the light source and another portion pervious to the light source.

4,052,713

UNIVERSAL SNAP MOUNTING FOR DISPOSABLE CHART PENS

William F. Lytle, Orange, and Thomas E. Cathcart, Jr., Lyme, both of Conn., assignors to Waterbury Scroll Pen Corporation, Stratford, Conn.

Filed Nov. 1, 1976, Ser. No. 737,495
Int. Cl.[2] G01D *15/16*
U.S. Cl. 346—140 A 8 Claims



1. A universal, snap-on pen cartridge device for attachment to the moving pen arm of chart recorders, comprising in combination:

a. pen body containing an ink reservoir and a stylus connected therewith, adapted for engagement with the paper carried by the recorder,

b. said body having a raised portion adjacent the stylus, and having a substantially flat surface against which a corresponding flat part of the recorder arm can bear,

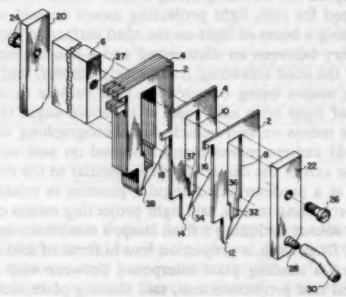
c. a resilient metal clip attachable to said body, said clip having a generally U-shaped configuration, and including a pair of leg portions and a connecting web portion,
d. means on said body located to be spaced from said body raised portion, defining a pair of oppositely located shoulders,
e. detent means on the leg portions of said clip respectively for engagement with said opposite shoulders to thereby hold the clip captive on the body,
f. said raised portion of the body being adapted for engagement with a cooperable end portion of the recorder pen arm to constitute a positioning device therewith.

4,052,714

ELECTROGRAPHIC RECORDING HEAD HAVING AN INTEGRAL RECORDING ELECTRODE CLEANING MEANS

Dean M. Peterson, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 2, 1976, Ser. No. 654,565
Int. Cl.² G03G *15/048, 17/00*
U.S. Cl. 346—155 **9 Claims**



1. An electrographic recording head comprising
an electrode support means,
an electrode means mounted on said support means and including a plurality of electrode plates with each plate having a slot therein and said electrode support means including a common support bar fitting within said slot to mount said electrode means in a layered arrangement of said electrode plates thereon, each of said electrode plates having a recording pin and an electrical connection terminal as extensions thereof,
said electrode means having an internal air plenum within said electrode plates and an air passage means from said air plenum to a location adjacent to said recording pin of each of said electrode plates and
sealing means in contact with said electrode means for sealing said air plenum and for connecting said air plenum to an air source.

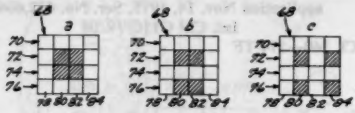
4,052,715

DIGITAL HALF-TONE GREY SCALE EXPANSION SYSTEM

William Streifer, Palo Alto, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 25, 1976, Ser. No. 661,229
Int. Cl.² G03G *15/04*
U.S. Cl. 346—160 **2 Claims**

1. A variable half-tone image generating system for use in a flying-spot scanning system comprising:
an image surface having at least one unit cell which is divided into a plurality of elemental sub-cells of a given area,
means for producing a light beam of high intensity,
means adapted to scan said light beam across each of said sub-cell areas of said at least one unit cell, and
means for both (1) modulating the intensity of said light beam so that only a selected number of said sub-cell areas within said at least one unit cell are exposed to said scanning light beam and (2) varying the position of said selected number of sub-cells within said at least one unit cell so that the ratio of the area of said selected number of sub-cells to the unexposed perimeter of said selected number of sub-cells varies to thereby provide a varying grey scale within said unit cell from a fixed number of exposed sub-cells.



4,052,716

FIRE AND INTRUDER DETECTION AND ALARM APPARATUS

Tage A. Mortensen, 904 Lake of the Forest, Bonner Springs, Kans. 66012

Filed Mar. 29, 1976, Ser. No. 671,267
Int. Cl.² G08B *21/00*
U.S. Cl. 340—233 **16 Claims**

1. For use in alarm systems or the like wherein at least a pair of adjacent portions of a single space are under surveillance, apparatus for detecting changes in the nature of free-space radiations emanating from said adjacent portions resulting from an occurrence associated with an alarm condition including:
at least one pair of radiation responsive sensing means each having a pair of electrical connection points and characterized by presenting between said points an electrical parameter of variable level which changes in response to changes in the level of radiations being sensed,
said one pair of said sensing means being operative to sense radiations emanating from said adjacent portions of said space;
means for rendering each of said one pair of said sensing means respectively operative to receive and sense radiations emanating from corresponding ones of said adjacent portions of said space;
electrical bridge circuit means having a pair of opposed reference terminals, a pair of opposed output terminals, and a plurality of electrically conductive bridge arms respectively extending to each of said output terminals respectively;
means electrically coupling said points of each of said one pair of said sensing means respectively in electrical series with the respective ones of one adjacent pair of said bridge arms; and
means for detecting changes occurring in an electrical parameter presented between said output terminals in excess of a prescribed rate of change of said parameter and indicative of an alarm condition, whereby changes including those due either to a fire or to the presence of an intruder in either of said adjacent portions of said space will be detected, while slow changes due to gradual alteration of radiation conditions such as the ambient temperature of said adjacent portions will be ignored.

4,052,717

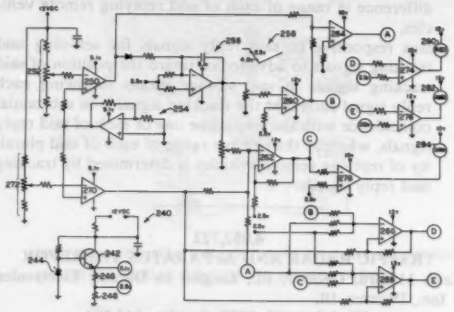
BATTERY CONDITION MONITORING METHOD AND APPARATUS

John B. Arnold, Seville; John M. Bowyer, Copley; Howard R. Hegbar, and Archie B. Shaefer, both of Akron, all of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Oct. 14, 1975, Ser. No. 622,200

Int. Cl.[2] G08B *21/00*

U.S. Cl. 340—249 **16 Claims**



1. A battery condition monitoring device, comprising:

an external load in selective engagement with the battery;

first circuit means connected to the battery for creating an output voltage which is a function of battery terminal voltage;

second circuit means connected to said first circuit means for receiving said output voltage and determining the time period necessary for the output voltage to change a predetermined amount after application of said external load to the battery; and

third circuit means connected to said second circuit means for comparing said time period to preset reference values and grading the battery according to such time period.

4,052,718

ENCLOSURE ALARM SYSTEM

Domenick Tucci, 12 Ridge Road, Mount Kisco, N.Y. 10549, and Lewis Cantalupi, 79 Beaumont Circle, Yonkers, N.Y. 10710

Continuation of Ser. No. 511,353, Oct. 2, 1974, abandoned. This application Apr. 2, 1976, Ser. No. 673,349

Int. Cl.[2] G08B *13/08*

U.S. Cl. 340—274 R **5 Claims**

1. An alarm system for association with an enclosure which is closed by the movement of a member of the enclosure relative to the remainder of the enclosure to give an audible alarm upon an improper entry into the enclosure by an opening movement of the enclosure member but will be silent upon a proper entry into the enclosure by an opening movement of the enclosure member, said alarm system comprising: a casing member for association with the enclosure, means mounted within said casing member for providing a source of direct current; audible alarm means mounted within said casing member and electrically connected in series to said direct current means; deactivating switch means operatively positioned on the casing member and available for actuation exteriorly from said enclosure and electrically connected in series with said alarm for interrupting the circuit from said direct current means to said alarm means to thereby permit authorized entry into the enclosure by an opening of the enclosure member when desired; and a pressure responsive switch means mounted on the enclosure for direct engagement with and depression by the enclosure member to open said pressure responsive switch means when the enclosure member is in a closed position, thereby placing said alarm means in a deactivated state, said pressure responsive switch means, upon an improper movement of the enclosure member to an open position, closing the circuit between said direct current means and said alarm means, so that such improper opening movement of the enclosure member without a prior deactivating of the alarm by a positive actuation of said deactivating switch means will cause the activation of the audible alarm system to give and continuously maintain an audible noise until the deactivation thereof is initiated by a positive actuation of either the deactivating switch means or the pressure responsive switch means.

4,052,719

TELEVISION RECEIVER SYSTEM HAVING FACILITY FOR STORAGE AND DISPLAY OF CHARACTER INFORMATION SELECTED FROM DIGITALLY ENCODED BROADCAST TRANSMISSIONS

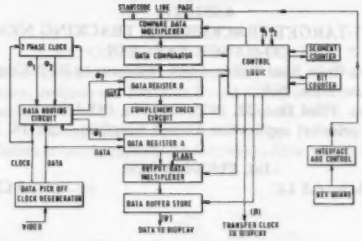
Peter Richard Hutt, Richmond; Alan Ronald Blake, London; Gunter von Cavallar, South Wonston, near Winchester; Brian Neil Douglas, London, and Philip John Dodds, Southampton, all of England, assignors to Independent Broadcasting Authority, London, England

Continuation of Ser. No. 493,110, July 30, 1974. This application May 3, 1976, Ser. No. 682,370

Claims priority, application United Kingdom, July 30, 1973, 36206/73

Int. Cl.[2] G06F *3/14;* **H04L** *7/08*

U.S. Cl. 340—324 AD **21 Claims**

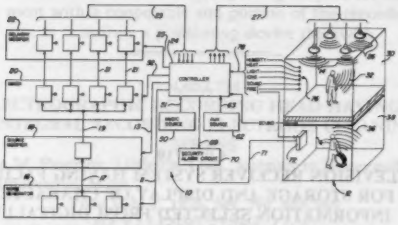


1. A television receiver system having a memory device, a clocking device for actuating the memory device, an input for a set of pages of information received at said input in the form of digitized characters in a repeated cycle the form of which is such that the digitized characters for the set of pages are received in groups of the characters, and the whole of the information for the set of pages is received during each occurrence of the cycle, each group as received being preceded by a clock run-in signal, to which the clocking device is responsive for synchronization, followed by a known start code correct receipt of which indicates integrity of reception and also followed by a page address code, variable selector means for selecting a page from the set of pages and routing a group of digitized characters to the memory device when the preceding start code is received correctly and the preceding page address code corresponds with the selected page while disregarding digitized groups of characters preceded by an incorrectly received start code and groups of characters preceded by a page address code other than that selected, a reading device operable to read the digitized characters repeatedly from the memory device, and a character generator responsive to the digitized characters read by the reading device to provide output signals for visual display by an intensity modulated raster of the television reception type.

4,052,720
DYNAMIC SOUND CONTROLLER AND METHOD THEREFOR

Howard Norman McGregor, 6651 S. Wellington Court, Littleton, Colo. 80121, and Robert Charles Chanaud, 1708 Hillside Road, Boulder, Colo. 80302

Filed Mar. 16, 1976, Ser. No. 667,449
Int. Cl.[2] G08B *29/00*
U.S. Cl. 340—420 **34 Claims**



1. A sound control system for operation in a room of a building, said system comprising:

means for producing masking noise,

means for providing a plurality of cyclic predetermined timed intervals, each of said intervals being capable of being a different time duration,

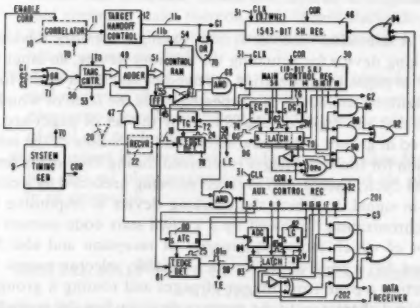
means receptive of said noise and cooperative with said providing means for automatically modifying said noise in a plurality of predetermined patterns corresponding to said plurality of intervals, and

speakers receptive of said modified noise for injecting said modified noise into said room.

4,052,721
MULTI-TARGET TRACKER FOR TRACKING NEAR CO-RANGE TARGETS

Walter Lee Ross, Simi Valley, Calif., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,478
Claims priority, application United Kingdom, Apr. 14, 1975, 15218/75
Int. Cl.[2] G01S *9/56*
U.S. Cl. 343—6.5 LC **5 Claims**



1. In combination,

means for tracking reply signals from remote vehicles responding to interrogating signals;

means for distinguishing reply signals of one remote vehicle from the reply signals of another remote vehicle having a range that is nearly the same range as said one vehicle by generating first and second timing signals indicative of the receipt of a first reply signal closely followed by a second reply signal;

means responsive to said first and second timing signals for detecting respectively the leading edge and trailing edge of the respective reply signals and generating first and second tracking signals corresponding thereto; sequential storage means having a plurality of stages for storing each of said first and second tracking signals in a stage having a location corresponding to the range of each of said remote stations, each stage corresponding to a predetermined increment in range;

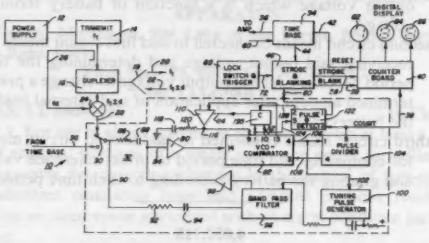
clock means for clocking said storage means to sequentially transfer said tracking signals from stage to stage so that each signal is in a stage corresponding to the relative difference in range of each of said replying remote vehicles;

means responsive to said reply signals for servoing said tracking signals to advance or retard the position of said tracking signals in said storage means following each reply signal such that the tracking signal is in substantial coincidence with the respective one of each of said reply signals, whereby the relative range of each of said plurality of replying remote vehicles is determined by tracking said reply signals.

4,052,722
TRAFFIC RADAR AND APPARATUS THEREFOR

Keith Millard, Decatur, Ill., assignor to Decatur Electronics, Inc., Decatur, Ill.

Filed Sept. 15, 1975, Ser. No. 613,302
Int. Cl.[2] G01R *23/02;* G01S *9/44*
U.S. Cl. 343—8 **18 Claims**



1. Apparatus for determining the frequency of an unknown periodic input signal which is in a range including a plurality of harmonics of the lowest frequency in the range and may be accompanied by noise comprising: source means providing a periodic output signal of variable frequency, said source means being adapted for locked operation at a sample frequency which is a predetermined multiple of said input signal whereby said periodic output signal is adjustable to match said input signal; frequency and phase comparator means responsive to said output signal and said input signal and generating a control signal which is applied to said source means to control the frequency thereof; and input means applying said input signal to said comparator and including tunable band pass filter means tunable over said range and by-pass means in parallel with said tunable band pass filter means applying a portion of said input signal to said comparator by-passing said tunable band pass filter means.

4,052,723
RANDOMLY AGGLOMERATED SUBARRAYS FOR PHASED ARRAY RADARS

Coleman J. Miller, Twin Harbors, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

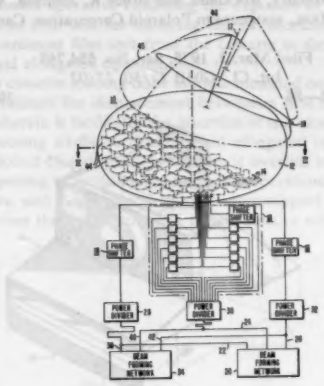
Filed Apr. 26, 1976, Ser. No. 680,251
Int. Cl.[2] H04B *7/00*
U.S. Cl. 343—100 LE **17 Claims**

1. A phased arranged antenna responsive to the excitation signals of a radar set, said antenna comprising:

a conducting surface; and

a regular array of radiating elements arranged on said con-

ducting surface, the elements of said array having substantially the same amplitude excitation being agglomerated



into geometrically irregular subarrays to substantially reduce the grating lobes of the antenna pattern.

4,052,724

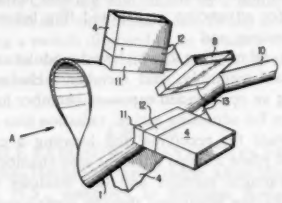
BRANCHING FILTER

Yoshihiro Takeichi; Tsutomu Hashimoto; Fumio Takeda, all of Kamakura, and Takashi Katagi, Yamato, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 534,840, Dec. 20, 1974, abandoned. This application Sept. 15, 1976, Ser. No. 723,654

Int. Cl.[2] H01Q *13/02*; H01P *5/12*

U.S. Cl. 343—786 **6 Claims**



1. A branching filter for a wave having multi-frequency bands, comprising:

two groups of coupling holes each of which is respectively connected to band-pass filter means and a branching waveguide, the filter means connected to one of said groups of holes being different from the filter means connected to another one of said groups of holes so as to selectively filter and branch waves having a particular frequency band into said respective branching waveguides,

said one of said groups of said coupling holes being arranged on a wall of a conical horn with an equal angle of circumference of 90 degrees between adjacent holes of said one of said groups of said coupling holes, and

said another one of said groups of said coupling holes being arranged on said wall of said conical horn with predetermined angles being defined between adjacent holes of said another one of said groups of said coupling holes, each of said holes of said another one of said groups of said coupling holes also being interposed between and separated from said adjacent holes of said one of said groups of said coupling holes by predetermined angles of circumference therebetween.

4,052,725

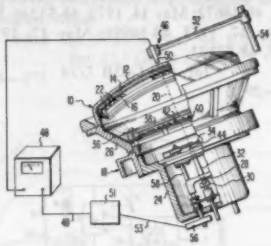
CATHODE-RAY TUBE SCREENING EXPOSURE METHOD

Douglas Earl Griesemer, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 2, 1976, Ser. No. 710,672

Int. Cl.[2] G03B *41/00*

U.S. Cl. 354—1 **5 Claims**



1. In a lighthouse method of making a luminescent screen structure for cathode-ray tube having a faceplate panel and an apertured color selection electrode in a predetermined position spaced from said panel wherein a photosensitive composition is coated on a surface of said panel, said composition having a solubility which is altered when exposed to light through said color selection electrode, the improvement comprising,

sensing the strength of a magnetic field passing through said color selection electrode and

adjusting the degree of exposure of said composition to said light as a function of the sensed strength of the magnetic field.

4,052,726

EXPOSURE CONTROL APPARATUS

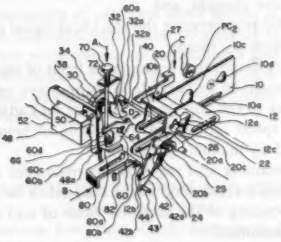
Clemens Hopfner, and Wolfgang Ort, both of Stuttgart, Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 471,402, May 20, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,026

Claims priority, application Germany, June 14, 1973, 2330253

Int. Cl.[2] G03B *7/14*

U.S. Cl. 354—29 **3 Claims**



1. In a camera having exposure-control apparatus to regulate the passage of light to expose film, light-responsive means for regulating said apparatus to expose the film over an interval corresponding to the level of scene brightness, means for limiting the duration of said interval to correspond to a predetermined scene brightness and means for resetting the apparatus after each exposure, the improvement comprising:

selectively actuatable means for disabling said limiting means; and

means, responsive to operation of said resetting means to reset said apparatus, for re-enabling said limiting means after each use in which said limiting means is disabled.

4,052,727

EXPOSURE CONTROL DEVICE FOR A SINGLE LENS REFLEX CAMERA

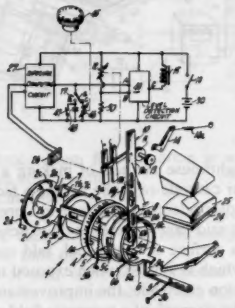
Tadashi Ito; Fumio Ito, both of Yokohama; Soichi Nakamoto, Machida, and Yasuo Isobe, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 455,536, March 28, 1974, abandoned. This application Nov. 25, 1974, Ser. No. 527,016

Claims priority, application Japan, Mar. 30, 1973, 48-36287; Apr. 28, 1973, 48-48672; May 14, 1973, 48-53296; May 17, 1973, 48-54997; May 17, 1973, 48-54998; May 17, 1973, 48-54999; May 22, 1973, 48-57332

Int. Cl.[2] G03B 7/14

U.S. Cl. 354—29 7 Claims



7. An exposure control system for a single lens reflex camera comprising:

a diaphragm device having an adjustable aperture;

means for adjusting the diaphragm aperture of said diaphragm device, said means starting its action with initiation of shutter release operation of said camera;

an exposure control device, including:

a photosensitive element for sensing the light passed through an objective lens at a fully opened diaphragm aperture, said element for converting the light passed through the objective lens to an electric signal;

means for memorizing the electrical signal of said photosensitive element; and

means for regenerating the electrical signal memorized in said memory means;

a subsidiary diaphragm arranged in front of said photosensitive element to be variable in its aperture opening corresponding to the adjusted amount of said adjusting means;

a shutter speed setting means capable of being selectively adjusted by manual operation;

means containing said regenerative means for setting a first level, said level setting means adapted to be set to a value corresponding to the adjusted value of said shutter speed setting means;

means for setting a second level, said means being set to a value corresponding to photographing light conditions;

a diaphragm deciding means, said means being provided with a means for comparing the output level of said first level setting means with that of said second level setting means;

means for locking said adjusting means responsive to the output of said comparison means;

a shutter control means responsive to said regenerative means; and

means for changing the connection of the regenerative means to the shutter control means from the first level setting means in association with the action of said locking means.

4,052,728

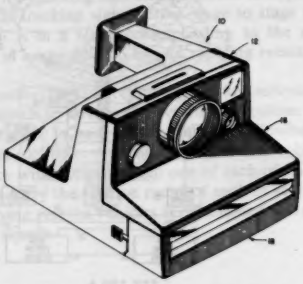
MODULAR PHOTOGRAPHIC SYSTEM ASSEMBLY

Donald H. Hendry, Rockland, and Bruce K. Johnson, Andover, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 3, 1975, Ser. No. 554,769

Int. Cl.[2] G03B 17/50, 17/02

U.S. Cl. 354—86 29 Claims



1. A modular inner camera assembly comprising:

a. a group of function providing modules each of which performs at least one of a series of photographic operations that attend the consecutive exposure and processing of a cassette of self-processable film units, said modules including:

1. a shutter module for providing a regulated exposure of a film unit,

2. a cassette loading door module including a pair of juxtaposed spreader rollers and a housing for processing an exposed film unit subsequent to its exposure, and

3. a gear train module for driving said juxtaposed rollers and for advancing an exposed film between them for processing; and

b. a structural member to which said modules are attached to form said assembly, said member including means for forming an open ended exposure chamber having an inlet aperture for admitting actinic radiation into said chamber and means for receiving and locating a cassette in an exposed plane located adjacent said chamber's open end, said structural member and said modules each, respectively, having positioned thereon complementary configured means for positioning said modules in a predetermined orientation with respect to each other and said cassette exposure plane in order to assure that proper spatial relationships are established and maintained between said modules and a cassette located in said exposure plane so that the photographic operations provided by said modules are properly carried out.

4,052,729

CAMERA WITH MOVABLE FILM DRIVE AND OPTICAL UNIT

Lawrence M. Douglas, South Easton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sept. 2, 1976, Ser. No. 720,006

Int. Cl.[2] G03B 17/50

U.S. Cl. 354—86 11 Claims

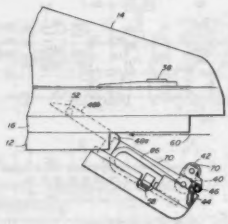
1. A photographic camera of the self-developing type for use with a substantially thin cassette containing a plurality of film units disposed therewithin in a stacked array extending across the thinnest portion of the cassette, the cassette having an exposure aperture overlying a forwardmost film unit, said camera comprising

A. a housing structure defining an elongated opening through which the cassette can be slidably inserted end-

wise to position its forwardmost film unit at the focal plane of said camera,

B. means operative following the exposure of the forwardmost film unit for initiating the advancement of the forwardmost film unit from the cassette in the direction of said elongated opening, and

C. a cassette loading door module mounted on said housing structure for displacement between a first open position wherein it facilitates the insertion of the cassette into said housing structure through said elongated opening and a second closed position wherein it overlies said elongated opening to facilitate photographic operations of said camera, said module including an outer support member that forms the lower front end of said camera when said module is disposed in its said second position, a frame connected to said outer support member, a pair of processing rollers mounted on said frame to receive therebetween, when said module is disposed in its said second position, the leading edge of the forwardmost film unit as it is advanced from the cassette by said advancement initiating means, a motor mounted on said frame, means mounted on said frame for drivingly connecting at least one of said rollers to said motor and means mounted on said frame for electrically coupling said motor to a battery positioned remote from said module, said electrically coupling means including a switch disposed to be actuated by the leading edge of the advancing forwardmost film unit as it approaches said rollers.

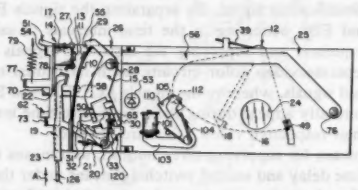


4,052,730

DOUBLE EXPOSURE PREVENTION DEVICE

William Thomas Hochreiter, and Fredric Alton Mindler, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 19, 1976, Ser. No. 678,271
Int. Cl.[2] G03B *15/03*
U.S. Cl. 354—135 **3 Claims**



1. In a photographic apparatus, the combination comprising:

a. shutter means actuable for effecting an exposure;

b. flash firing means, including a piezoelectric generator and a firing spring biased to move in response to actuation of said shutter from a cocked position to a striking position to strike said generator to produce a pulse of electricity, for activating a flash device associated with the photographic apparatus; and

c. exposure prevention means associated with said shutter means and said flash firing means for preventing actuation of said shutter means if said firing spring is not in said cocked position.

4,052,731

CASSETTE-LIKE DEVICE FOR ADVANCING AND WITHDRAWING A PREDETERMINED LENGTH OF FILM TO AND FROM A CAMERA

Robert H. Powers, Rochester, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed Apr. 9, 1976, Ser. No. 675,390
Int. Cl.[2] G03B *17/26*
U.S. Cl. 354—275 **22 Claims**

1. In a system for supplying and transporting photosensitive media across the exposure station of a camera, which system includes:

a. a disposable cassette for containing said photosensitive media;

b. a buffer box;

c. means for detachably fastening said buffer box to said cassette at a position thereon so that said media may be driven through said buffer box into the exposure station of said camera;

d. first drive means coupled to said buffer box for driving said photosensitive material emanating from said disposable cassette through said buffer box and into said camera;

e. second drive means coupled to said camera at a position thereon for actuating said first drive means for transporting said photosensitive media with respect to said buffer box when said buffer box is properly seated with respect to said camera, the improvement comprising;

f. seating means for properly seating said buffer box with respect to said camera and for causing said first drive means to be positioned with respect to said second drive means for enabling actuation of said first drive means by said second drive means and for producing limited controlled actuation of said first drive means in a first media feed out direction during the process of seating of said buffer box with respect to said camera and limited controlled actuation of said first drive means in a second media feed in direction during the process of unseating said buffer box.

4,052,732

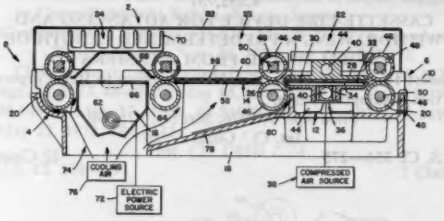
APPARATUS FOR DEVELOPING AND FIXING HEAT SENSITIVE FILM

John W. Meadows, Los Altos, Calif., assignor to Quantor Corporation, Mountain View, Calif.

Filed July 21, 1975, Ser. No. 597,800
Int. Cl.[2] G03D *13/00*
U.S. Cl. 354—297 **17 Claims**

1. Apparatus for developing and fixing exposed film having a light sensitive emulsion on a substrate of the film, the apparatus comprising: a developing station including first and second opposing platens defining therebetween a gap having a width greater than the thickness of the exposed film; transport means for continuously moving the exposed film past the developing station; means for heating the emulsion to its curing temperature as the film moves past the developing station; a fixing station disposed downstream of the developing station; means disposed between the developing station and the fixing station for cooling the film; the transport means including roller means

for transporting the film through the developing station, the cooling means and the fixing station; and means for driving the



roller means at a rate so that the film moves at a speed of at least about two inches per second.

4,052,733

PAL FOUR-FRAME SUBCARRIER PHASE DETECTOR

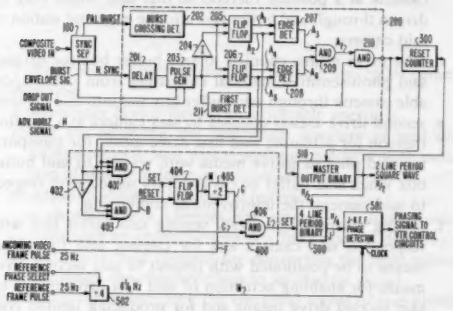
William Joseph Derenbecher, Jr., Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 30, 1976, Ser. No. 682,029

Claims priority, application United Kingdom, May 20, 1975, 21547/75

Int. Cl.[2] H04N 9/62, 9/46, 5/785

U.S. Cl. 358—10 **5 Claims**



1. A PAL frame phasing system for developing a phasing signal synchronized to a system frame reference signal and a PAL composite video signal including at least color burst and horizontal synchronizing components, comprising:

a color burst detector for developing a color burst switching signal at a two-line period representative of the polarity of burst phasing with respect to said horizontal component and for developing a four-line rate signal;

a four-line rate detector coupled to said burst detector and responsive to said color burst switching signal and to said four-line rate signal for developing a four-line rate signal representative of the burst phasing repetition rate;

first means coupled to said color burst detector and said four-line rate detector and responsive to said color burst switching signal and to said four-line rate signal representative of said burst phasing repetition rate for developing a first signal at a four-line period switching rate to said four-line rate signal representative of said burst phasing repetition rate signal;

second means responsive to said system frame reference signal for developing a second signal at a four-frame rate; and

phase detecting means coupled to said first and said second means and responsive to said first and second signals for developing a third signal representative of the phasing status of said first signal with respect to said second signal.

4,052,734

GRGB LINE SEQUENTIAL COLOR TELEVISION SYSTEM

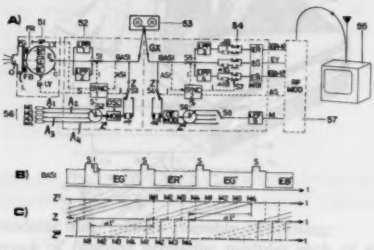
Walter Jaeger, Cureglia, Switzerland, assignor to GX-Holding AG., Basel, Switzerland

Filed Oct. 31, 1974, Ser. No. 519,742

Claims priority, application Switzerland, Oct. 31, 1973, 15306/73; Oct. 31, 1973, 15307/73; Oct. 31, 1973, 15308/73; Oct. 31, 1973, 15309/73; Oct. 31, 1973, 15310/73

Int. Cl.[2] H04N 9/34, 9/16

U.S. Cl. 358—12 **3 Claims**



1. In a television system, the combination of:

A. means for producing at a transmitter three color-video-signals EG^o, ER^o and EB^o, in which the signal EG^o contains predominantly the information content present in the green component of a picture, the signal ER^o contains predominantly the information content present in the red component of a picture, and the signal EB^o contains predominantly the information content present in the blue component of a picture;

B. first switching means for supplying said three signals, one at a time, in a cyclic sequence of four successive scanning line time intervals, with the signal EG^o occurring in every other one of the four time intervals, and with the color signals ER^o and EB^o occurring alternately in the two time intervals which intervene between said every other one of the four time intervals;

C. means for supplying a synchronizing signal for each time interval;

D. means for supplying an identification signal for each fourth time interval;

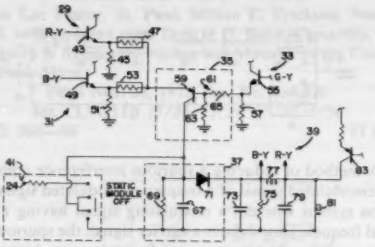
E. means, under the control of said synchronizing signal and identification signal, for separating the signals EG^o, ER^o and EB^o, occurring in the time intervals of said cyclic sequence, and supplying the separated signals to three separate video color circuits, each individual to one of said signals, whereby the signals EG^o, ER^o and EB^o intermittently appear during their respective time intervals in their respective video color circuits; and

F. means for supplying three outputs, said means including time delay and second switching means under the control of said synchronizing signal and said identification signal for causing the intermittently appearing signal EG^o, ER^o, and EB^o in respective ones of said three video color circuits to be repeated, individually, in said respective ones of said three video color circuits during the time intervals in which said separating means does not supply a signal to the respective ones of said video color circuits, whereby each of said three video color circuits substantially continuously supplies to the respective one of the said three outputs a signal corresponding to the signals EG^o, ER^o, and EB^o.

4,052,735
MODULATED FLESHTONE AND TINT CORRECTION CIRCUITRY

Robert Charles Wheeler, Elba, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 9, 1975, Ser. No. 584,939
Int. Cl.² H04N *9/535*
U.S. Cl. 358—28 **16 Claims**



1. A fleshtone and tint correction circuit for a color television receiver having chrominance and reference oscillator signal sources comprising:

first, second, and third color demodulator stages coupled to said chrominance and reference oscillator signal sources;

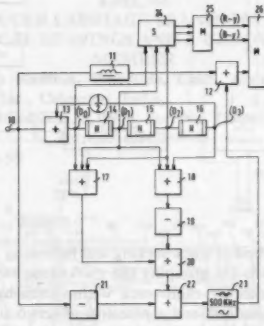
phase angle modulator means coupled to said reference oscillator signal source for altering the phase angle of signals applied to at least two of said first, second, and third color demodulator stages; and

fleshtone and tint correction detector means DC coupled to said first, second, and third color demodulator stages and to said phase angle modulator means, said detector means responding to the output from said demodulator stages to provide a control signal for altering the phase angle between at least two of said reference oscillator signals applied to said demodulator stages.

4,052,736
LINE-SEQUENTIAL COLOR TELEVISION ENCODING AND DECODING SYSTEM

Frank Anthony Griffiths, London, England, assignor to Decca Limited, London, England

Continuation-in-part of Ser. No. 508,814, Sept. 24, 1974, abandoned. This application Dec. 31, 1975, Ser. No. 645,717
Claims priority, application United Kingdom, Nov. 7, 1975, 46202/75
Int. Cl.² H04N *9/40, 9/535*
U.S. Cl. 358—37 **47 Claims**

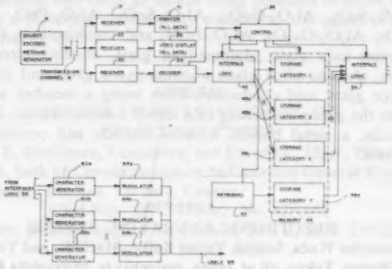


1. A colour television signal decoder, comprising means for comparing each line of an input signal in the form of a luminance component combined with a line-sequential chrominance component of lesser band-width with a signal containing an earlier line of corresponding chrominance so as to derive a signal denoting vertical luminance changes; means for averaging the input signal over a plurality of lines so as to derive a luminance signal of lower frequency; and means for reconstituting the luminance component from the derived signals in the frequency range of the associated chrominance component.

4,052,737
METHOD AND APPARATUS UTILIZING BAUDOT CODE FOR CATEGORIZING AND SELECTIVELY DISTRIBUTING INFORMATION TO A PLURALITY OF UTILIZATION UNITS

Bruce W. Robertson, Salt Lake City, and Pryce Neilson Hales, Centerville, both of Utah, assignors to Com Tel, Inc., Salt Lake City, Utah

Filed July 9, 1976, Ser. No. 703,953
Int. Cl.² H04N *7/10;* H04L *15/00;* G08B *23/00*
U.S. Cl. 358—86 **12 Claims**



10. A method of selectively distributing information to a plurality of information utilization units including

a. receiving a Baudot encoded information sequence in which the sequence includes a coded combination of figure shift and/or letter shift Baudot characters for designating the subject matter of the information contained in the sequence, where such information relates to one of a plurality of different subject matters,

b. decoding the combination of figure shift and/or letter shift characters to determine the subject matter of the information contained in the sequence,

c. applying the information contained in the sequence to one of a plurality of storage means, said one storage means being dedicated to storing information of the subject matter determined in step (b), and

d. applying the information from said one storage means to one or more selected utilization units dedicated to receive information of the subject matter determined in step (b).

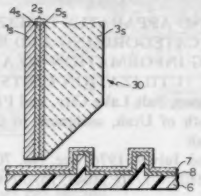
4,052,738
STYLUS FOR CAPACITIVE VIDEODISC

Fumio Hosomi, Moriguchi; Kiyotaka Wasa, Nara; Shigeru Eayakawa, Hirakata, and Takeshi Nagai, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Apr. 4, 1975, Ser. No. 565,259
Claims priority, application Japan, Apr. 4, 1974, 49-38600
Int. Cl.² G11B *11/06*
U.S. Cl. 358—128 **3 Claims**

1. A pick-up stylus for tracking in a groove in a recording disk having a conductive surface and a dielectric coating over said conductive surface for cooperating with said recording disk to provide capacitive variations between said stylus and said conductive surface when relative motion is established between said stylus and said recording disk, said stylus comprising an elongated bar of alumina having a conductive coating thereon, said coating comprising a conductive layer and a cementing layer sandwiched between said conductive layer

and the surface of said alumina bar, said cementing layer comprising an upper layer portion facing said conductive layer and a lower layer portion facing said alumina bar, said upper layer portion being an oxide of a material of said conductive layer and said lower layer portion being a solid solution of alumina and an oxide of a metal other than aluminum, the melting temperature of which is lower than the alumina, said solid solution being a member selected from the group consisting of



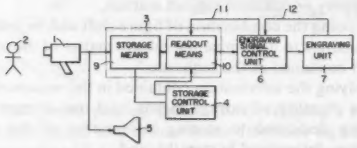
Al_2O_3-SiO_2, Al_2O_3-GeO_2, Al_2O_3-SnO_2, Al_2O_3-PbO, Al_2O_3-B_2O_3, Al_2O_3-Ga_2O_3, Al_2O_3-In_2O_3 and combinations thereof, alumina-soda glass, alumina-lead glass, alumina-borosilicate glass, alumina-silica glass, alumina-pyrex glass and alumina-vycor glass, said conductive layer being a member selected from the group consisting of a metal, a metal nitride, a metal silicide, a metal boride, a metal carbide and combinations thereof.

4,052,739

ELECTRONIC ENGRAVING SYSTEM

Masanobu Wada, Sendai; Yujiro Koike, Machida, and Yoshihisa Okuma, Tokyo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka and Dai Nippon Printing Company, Ltd., Tokyo, both of Japan

Continuation-in-part of Ser. No. 360,050, May 14, 1973, abandoned. This application Jan. 30, 1976, Ser. No. 653,954
Claims priority, application Japan, May 19, 1972, 47-49135
Int. Cl.[2] H04N *1/28, 5/76*
U.S. Cl. 358—299 **7 Claims**



1. An electronic engraving system comprising:

an image pickup means for generating electric signals corresponding to an object;

a signal storage and readout means of the scanning conversion type for storing said electric signals from said image pickup means at a high speed and reading out said stored electric signals at a low speed corresponding to an engraving speed in accordance with command signals;

an engraving means for engraving a picture of the object on a material in response to said read out electric signals, said engraving means including an engraving head having an engraving style arranged to face an engraving table, means for reciprocating said engraving table or engraving style and means for shifting said engraving style transversely to the direction of the reciprocation of said engraving table or engraving style; and

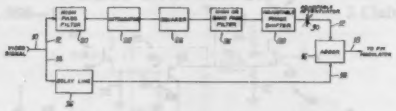
a command signal producing means for producing said command signals, said command signal producing means including a pulse producing means for producing pulses in response to the reciprocation of said engraving table or engraving style and a synchronizing pulse generating circuit for generating a synchronizing pulse in response to said pulses produced by said pulse producing means.

4,052,740

MOIRE INTERFERENCE REDUCING CIRCUIT FOR FM VIDEO RECORDERS

Charles Hubert Coleman, Jr., Belmont, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Mar. 19, 1976, Ser. No. 668,379
Int. Cl.[2] G11B *5/02*
U.S. Cl. 360—30 **18 Claims**



1. A method of reducing a spurious interference component in a demodulated signal of a frequency modulated signal transmission system wherein a modulating signal having a fundamental frequency modulates a carrier signal, the spurious interference component being caused by interaction between the fundamental frequency and the carrier signal, comprising the steps of:

adding a second harmonic frequency of said modulating signal in a predetermined phase and amplitude to said fundamental modulating signal prior to frequency modulating said carrier signal; and,

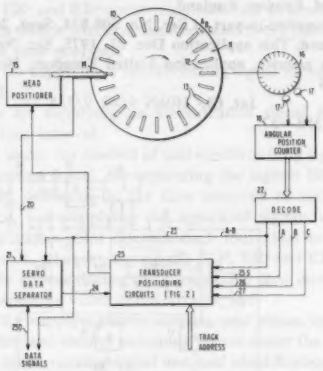
thereafter frequency modulating said carrier signal with said modulating signal having its second harmonic frequency added thereto at said predetermined phase and amplitude, the phase and amplitude of the second harmonic frequency being such that the interference component in the demodulated signal is reduced.

4,052,741

TRACK SEEKING AND FOLLOWING

Joseph Philip Baca, Longmont, and Peter Thomas Marino, Boulder, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1975, Ser. No. 643,900
Int. Cl.[2] G11B *21/10, 5/012*
U.S. Cl. 360—77 **21 Claims**



1. The method of track seeking and following using a pattern of servo signals for grouping the tracks into bands with servo signal durations for each track within each band being in a unique combination, and a plurality of servo signals for each track disposed along a given sector length of each said track;

the improvement including the following steps in combination:

measuring durations of said servo signals for indicating track position within a band; and

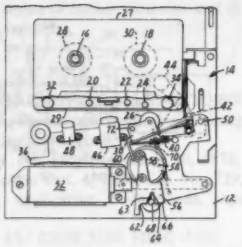
measuring energy of each said servo signals and comparing same for indicating position error with respect to said indicated track.

4,052,742

MAGNETIC TAPE RECORDER DRIVE MECHANISM HAVING A LATCHING MEMBER WITH A PAUSE MODE AND A STOP MODE

Sheldon Lee Pastor, St. Paul; Milton E. Erickson, North St. Paul, both of Minn., and Donald D. Kahn, Camarillo, Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 28, 1975, Ser. No. 636,320
Int. Cl.[2] G11B *15/26, 15/24, 15/10, 5/54*
U.S. Cl. 360—96 **11 Claims**



1. A driving mechanism of a magnetic tape recorder suitable for voice logging use comprising

a frame,

a tape transport assembly mounted on the frame including a driven capstan and a pressure roller mechanically biased toward the capstan and movable between a run mode position at which the roller is positioned to press the tape against the capstan, and a record/playback head is in full contact with the tape, a pause mode position at which the roller is slightly withdrawn from the capstan and the head is in contact with said tape, and a stop mode position at which the roller is appreciably withdrawn from the capstan and the head is fully retracted from the tape,

latching means for mechanically holding the roller in either the pause mode position or the stop mode position against the mechanical bias, and

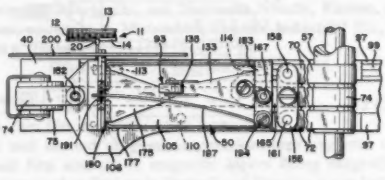
trigger means including a solenoid for releasing the latching means to allow the roller to quickly move into the run mode position to provide fast starting capability.

4,052,743

TRANSDUCER CARRIAGE TRANSPORT HAVING CYLINDRICAL BEARINGS AND A GROOVED GUIDE MEMBER

Boyd Lehman Stratton, Woodside, Calif., assignor to Arvin Industries, Inc., Columbus, Ind.

Filed Nov. 3, 1976, Ser. No. 738,605
Int. Cl.[2] G11B *5/00*
U.S. Cl. 360—99 **5 Claims**



1. A disc recorder comprising:

a rotating disc,

a transducer for coacting with said disc,

a guide member having a guide surface extending transversely of said rotating disc and including a groove extending parallel to said disc,

a carriage means for mounting the transducer, positioned generally parallel to and movable along said guide surface,

a friction reducing bearing pad mounted on said carriage means and movable along said guide surface,

friction reducing cylindrical bearing means mounted on said carriage means in spaced relation to said pad and movable in said groove,

a locating member having a locating surface positioned substantially parallel to said guide surface,

loading means mounted on said carriage means and engaging said locating surface to bias said carriage means toward said guide surface such that said bearing pad engages said guide surface and said cylindrical bearing means engages said groove, and

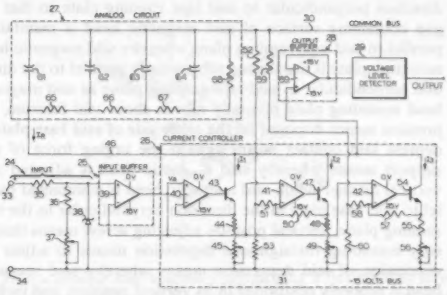
means for moving said carriage means along said guide surface, said carriage means being confined to move only in a direction substantially parallel to the plane of said rotating disc.

4,052,744

TEMPERATURE MONITORING OF SEMICONDUCTORS

David R. Boothman, Ennismore, and Everett C. Elgar, Peterborough, both of Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada

Filed Nov. 25, 1975, Ser. No. 635,141
Claims priority, application Canada, Dec. 2, 1974, 215024
Int. Cl.[2] H02H *7/20*
U.S. Cl. 361—103 **11 Claims**



1. A circuit for monitoring the temperature of a junction of a semiconductor comprising:

a. means for producing a signal having a value which is a function of the current conducted by the semiconductor;

b. an electrical circuit analog of the thermal system of the semiconductor, said analog including electrical representations of the heat capacities of a total semiconductor structure including a heat sink and further including electrical representations of the thermal resistances from the junction to ambient;

c. a current controller in circuit with said analog for controlling the current of said analog, said analog and said controller together comprising an analog-controller circuit;

d. means for furnishing the current of said analog-controller circuit;

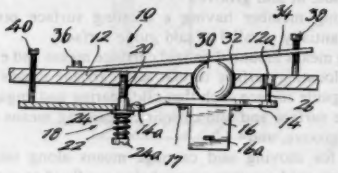
e. means for applying said signal to said controller for controlling the conduction thereof whereby the control of said controller by said signal is such that the relation of signal value to the analog current magnitude approximates the power dissipation characteristic of the semiconductor junction; and,

f. means connected to said analog for detecting a voltage thereof representative of junction temperature.

4,052,745
MAGNETIC HEAD ADJUSTMENT MEANS FOR A MAGNETIC TAPE MACHINE

Niro Nakamichi, Kodaira, Japan, assignor to Nakamichi Research Inc., Kodaira, Japan

Filed Apr. 21, 1976, Ser. No. 679,027
Claims priority, application Japan, Apr. 26, 1975, 50-57119[U], May 1, 1975, 50-59328[U
Int. Cl.[2] G11B 21/24
U.S. Cl. 360—109 9 Claims



1. Magnetic head adjustment means for a magnetic tape machine, comprising a base plate a magnetic head mounting plate on which a magnetic head is securely mounted adjacent to one end thereof; support means provided adjacent to a middle portion of said magnetic head mounting plate to movably attach said magnetic head mounting plate to said base plate to permit a head gap of said magnetic head to incline in a magnetic tape running plane and so as to resiliently urge said magnetic head mounting plate toward said base plate; contact means to slidably extend through said base plate and to engage said magnetic head mounting plate as a fulcrum in the plane in which the head gap is contained and at two points of said magnetic head mounting plate spaced to each other along the direction perpendicular to said tape running plate so that the gap containing surface of said magnetic head is maintained parallel to said tape running plane whereby said magnetic head mounting plate is maintained substantially parallel to the direction perpendicular to said tape running plane as said magnetic head mounting plate pivotally moves about said fulcrum; depression means disposed on the other side of said base plate to depress said contact means against the urging force of said support means whereby said magnetic head is adjusted in a vertical manner while said magnetic head is maintained parallel to said base plate in the direction perpendicular to the tape running plane; vertical position adjusting screw means threadedly extending through said depression means to adjust the depression of said depression means whereby said magnetic head is properly positioned in its vertical position; and inclination adjusting screw means threadedly extending through said base plate to engage said magnetic head mounting plate at the other end and to pivotally move said magnetic head mounting plate about said fulcrum against the urging force of said support means whereby said magnetic head is properly positioned in its inclination in said magnetic tape running plane.

4,052,746
HEAD ASSEMBLY FOR MAGNETIC RECORDERS

Ivor Weller, San Lorenzo, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 2, 1976, Ser. No. 654,488
Int. Cl.[2] G11B 21/24, 21/08, 5/016
U.S. Cl. 360—109 7 Claims

1. A head assembly for a dual flexible disc magnetic recorder, each disc having defined on its recording surface a plurality of concentric recording tracks for the storage of information thereon, said head assembly comprising:

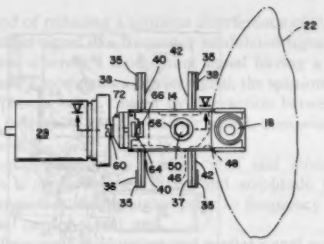
mounting bracket means;

a pair of head carriages, each including a recording head affixed thereto;

means for releasably attaching each of said head carriages to said mounting bracket means, with its respective head operatively abutting the recording surface of one of said discs;

means connected to said mounting bracket means for moving said mounting bracket means radially with respect to the recording discs to enable the positioning of said head on any given track defined on its respective said recording disc; and

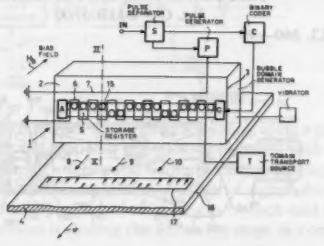
adjustment means connected to each of said carriages for individually adjusting the radial position of each head carriage with respect to its associated disc independently of the movement of said mounting bracket means by said means for moving in order for said heads to be simultaneously positionable by said mounting bracket means on corresponding tracts on their respective discs, said adjustment means for each head carriage comprising an adjustment screw disposed through a pair of first bores respectively defined in said mounting bracket means and said head carriage, means for limiting movement of said adjustment screw in said first bore of said mounting bracket means such that said adjustment screw is allowed to have only rotative movement with respect to said mounting bracket means, and a screw fastening means mounted in a second bore defined in said head carriage and fastened to said adjustment screw such that the turning of such adjustment screw causes said screw fastening means and thus the head carriage and head thereon to be moved in an inward or outward direction relative to said mounting bracket means and thus radially with respect to the recording disc corresponding to said head carriage.



4,052,747
DEVICE FOR THE MAGNETIC DOMAIN STORAGE OF DATA HAVING A SHIFT REGISTER FILLED WITH CODED SERIES OF DOMAINS

Jan Roos, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 26, 1976, Ser. No. 661,735
Claims priority, application Netherlands, Mar. 3, 1975, 7502455; Aug. 15, 1975, 7509734
Int. Cl.[2] G11C 11/42
U.S. Cl. 360—110 26 Claims



1. A magnetic transducing device for recording information

in a magnetizable recording medium and for reproducing the information recorded therein, comprising a layer having a layer of magnetizable material, means for maintaining magnetic bubble domains in said layer including a main magnetic field generator, a field produced by said generator extending transversely to the layer, said layer being adapted to be coupled magnetically with the recording medium for transducing of information, means for generating magnetic bubble domains in the layer, an information input means, a bubble domain coding device connected to said information input means, and means to generate a magnetic transfer field having a field strength and orientation at which the required coupling between the bubble domain and the recording medium is effected, a first shift register for magnetic bubble domains, said magnetic bubble generator means being connected to said first shift register, said bubble domain coding device comprising means for filling the shift register with successive coded series of bubble domains, and means for effecting the coupling between at least one series of bubble domains and the recording medium at desired instants.

4,052,748

MAGNETORESISTIVE MAGNETIC HEAD

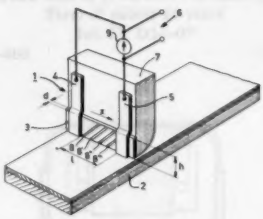
Karel Elbert Kuijk, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 560,164, March 20, 1975, abandoned. This application Oct. 4, 1976, Ser. No. 729,220

Claims priority, application Netherlands, Apr. 1, 1974, 7404362

Int. Cl.² G11B *5/30*; H01C *7/16*

U.S. Cl. 360—113 **5 Claims**



1. A magnetic head for detecting information representing magnetic fields on a magnetic recording medium and comprising an elongate magneto-resistive element of a magnetically anisotropic material which at its ends has contacts for the connection to a current or voltage source, the easy axis of magnetization thereof coinciding with the longitudinal axis of the element and said head further including means to force the current to travel at an angle of minimum 15° and maximum 75° with the longitudinal axis of said element said means including one readily conductive equipotential strip intermediate said current contacts in oblique relationship to said longitudinal axis.

4,052,749

THIN FILM MAGNETIC HEAD

Noboru Nomura, Kyoto; Kenji Kanai, Neyagawa; Nobuyuki Kaminaka, Moriguchi, and Norimoto Nouchi, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 19, 1976, Ser. No. 688,076

Int. Cl.² G11B *5/20, 5/14, 5/16*

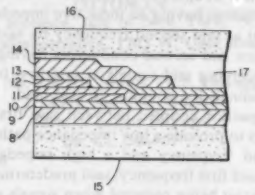
U.S. Cl. 360—123 **12 Claims**

1. A thin film magnetic head comprising:

first and second magnetic layers forming magnetic cores, said first and secod magnetic layers being magnetically connected at first ends thereof and forming a gap between second ends thereof;

at least one conductor layer positioned between said first and second magnetic layers, said conductor layer comprising winding means through which current flows during use of the magnetic head;

said at least one conductor layer having on each of two opposite sides thereof a separating layer means for separating and electrically isolating said conductor layer from adjacent layers; and



said separating layer means on at least one side of said at least one conductor layer including a semiconductor layer.

4,052,750

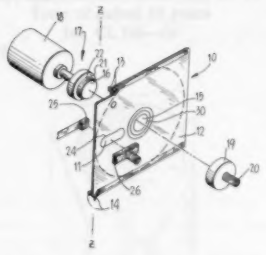
FLEXIBLE RECORDING DISK WITH IMPROVED SPINDLE MOUNTING MEANS

John A. Barber; C. Norman Dion, and Richard N. James, all of San Jose, Calif., assignors to Dysan Corporation, Santa Clara, Calif.

Filed Dec. 5, 1975, Ser. No. 637,915

Int. Cl.² G11B *5/82*; B65D *85/02*; G11B *5/016*; H05F *3/00*

U.S. Cl. 360—135 **13 Claims**



1. In a flexible disc assembly comprising a flexible disc having a pliant substrate and at least one recording layer on said substrate, said disc having a central aperture adapted to receive a rotatable drive spindle, and a jacket substantially enclosing said flexible disc and permitting rotation of said flexible disc therewithin, the improvement comprising reinforcement means adhered to at least one surface of said disc adjacent said central aperture for preventing deformation of said disk in the region of said central aperture and for protecting said recording layer, said reinforcement means being fabricated from a material having sufficient electrical conductivity to prevent accumulation of electrical charges on said disc.

4,052,751

GROUND FAULT INTERRUPTER CIRCUIT

Marshall Howard Shepard, Shrewsbury, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Apr. 12, 1976, Ser. No. 676,329

Int. Cl.² H02H *3/16*

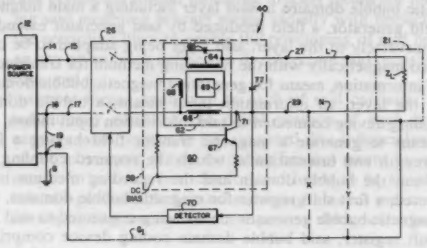
U.S. Cl. 361—50 **4 Claims**

1. A ground fault interrupter circuit for interrupting signals at a first frequency conducted to a load from a source in the presence of a path to ground for leakage current, said ground fault interrupter circuit comprising:

oscillator means for generating signals at a second frequency, said oscillator means having feedback means including a parallel circuit with a predetermined Q at said second frequency, said parallel circuit being formed by a first capacitor coupled in parallel with first, second, and third conductors having an inductive impedance tuned to be resonant at said second frequency by said first capacitor, said first and second conductors having input terminals for receiving said signals at said first frequency and output terminals for coupling to said load;

a second capacitor coupled between said first and second conductors to provide a low impedance path for signals at said second frequency and a high impedance path for signals at said first frequency, said predetermined Q of said parallel circuit being reduced when signals at said second frequency are conducted along a continuous path including said first and second conductors, said second capacitor and a path for said leakage current from said first conductor to said ground; and

switching means coupled to said first and second conductors for interrupting signals conducted from said source to said



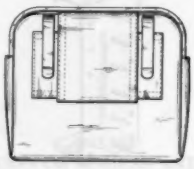
load when said predetermined Q of said resonant circuit is reduced.

DESIGNS

OCTOBER 4, 1977

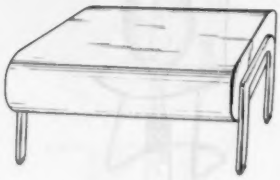
245,946
SHOE
Tatsuo Fukuoka, No. 3, 3-Ban, 2-Chome, Shin-Minami-Fukushima, Tokushima, Japan
Filed Aug. 4, 1975, Ser. No. 601,843
Claims priority, application Japan, May 28, 1975, 50-21538
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—308

245,947
TENNIS BALL POUCH WITH BELT CLIP
Betty Finley, 10 W. 66th St., New York, N.Y. 10023
Filed Oct. 8, 1975, Ser. No. 620,718
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400

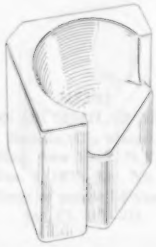


245,948
FACIAL CLEANING APPARATUS
Martin J. Wolff, West Haven, Conn., assignor to Sperry Rand Corporation, Bridgeport, Conn.
Filed Jan. 12, 1976, Ser. No. 648,375
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—14

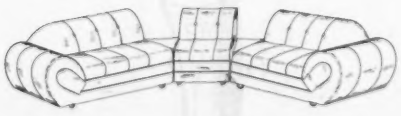
245,949
OTTOMAN
Aubrey Amey, deceased, late of New York, N.Y., by Greta A. Beckner, administratrix, 1703 W. Case Road, Columbus, Ohio 43220
Division of Ser. No. 574,109, May 2, 1975. This application Aug. 27, 1976, Ser. No. 718,313
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—36



245,950
CHAIR
Florence M. Mathur, 283 Mapledene Drive, Ancaster, Ontario, Canada
Filed Feb. 12, 1976, Ser. No. 657,402
Claims priority, application Canada, Jan. 29, 1976, 2901761
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—37

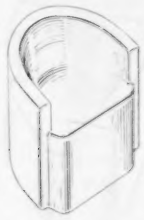


245,951
COMBINED SECTIONAL SOFA AND MULTIPLE TABLE UNIT
Gerald L. Lande, 3672 S. Newport St., Denver, Colo. 80237
Filed June 1, 1976, Ser. No. 692,007
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—46



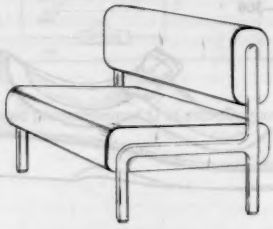
245,952
CHAIR
Ernst Lüthy, Klingnau, Switzerland, assignor to De Sede AG, Klingnau, Switzerland
Filed Dec. 19, 1975, Ser. No. 642,405
Claims priority, application Switzerland, June 24, 1975, 61202/75
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

245,953
CHAIR
Florence M. Mathur, 283 Mapledene Drive, Ancaster, Ontario, Canada
Filed Feb. 12, 1976, Ser. No. 657,401
Claims priority, application Canada, Jan. 29, 1976, 2901762
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



245,954
COMBINED STOOL AND PERISCOPE
Richard T. Tosaw, P.O. Box 888, Modesto, Calif. 95353
Filed May 28, 1976, Ser. No. 691,000
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—74

245,955
CHAIR
Aubrey Amey, deceased, late of New York, N.Y., by Greta A. Beckner, administratrix, 1703 W. Case Road, Columbus, Ohio 43220
Division of Ser. No. 574,109, May 2, 1975. This application Aug. 27, 1976, Ser. No. 718,312
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—78



245,956
EYEGLASS DISPLAY UNIT
Richard S. Dunchock, Farmington Hills, Mich., assignor to Optarac Corporation, Hollywood, Fla.
Division of Ser. No. 498,542, Aug. 19, 1974, Pat. No. D. 241,196. This application Dec. 15, 1975, Ser. No. 640,831
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85

245,957
UTENSIL HOLDER OR SIMILAR ARTICLE
Peter Stein, 47 Stager St., Nutley, N.J. 07110
Filed Apr. 12, 1976, Ser. No. 675,988
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—114

245,958

FOOD DISPLAY OVEN

Ronald R. Roderick, Evergreen, Colo., assignor to National Equipment Corporation, Denver, Colo.

Division of Ser. No. 434,446, Jan. 18, 1974, Pat. No. D.238,471.

This application Aug. 28, 1975, Ser. No. 608,674

Term of patent 14 years

Int. Cl. D20—*02*

U.S. Cl. D6—172

245,959

SPOON OR SIMILAR ARTICLE

Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,311

Term of patent 14 years

Int. Cl. D7—*03*

U.S. Cl. D7—137

245,960

SPOON OR SIMILAR ARTICLE

Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,312

Term of patent 14 years

Int. Cl. D7—*03*

U.S. Cl. D7—137

245,961

SPOON OR SIMILAR ARTICLE

Z. George Zephries, Roselle, Ill., assignor to American Home Products Corporation, New York, N.Y.

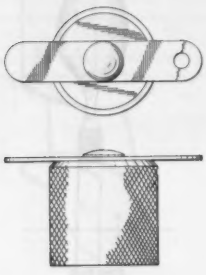
Filed Nov. 6, 1975, Ser. No. 629,313

Term of patent 14 years

Int. Cl. D7—*03*

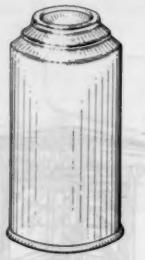
U.S. Cl. D7—150

245,962
POUR SPOUT PERFORATING TOOL
Michael W. Brandt, 1111 W. Mockingbird Lane, Suite 565, Dallas, Tex. 75247
Filed Feb. 2, 1976, Ser. No. 654,294
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—41

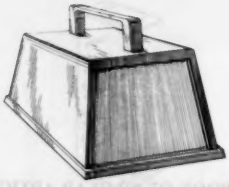


245,963
BOTTLE OR SIMILAR ARTICLE
John W. Lewman, Blue Springs, Mo., assignor to Ethyl Development Corporation, Baton Rouge, La.
Filed May 17, 1976, Ser. No. 687,081
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—143

245,964
CAN OR SIMILAR ARTICLE
Edward William Sexton, Sr., 20 Collidge Ave., Cambridge, Mass. 02139, and Edward W. Sexton, Jr., 990 Massachusetts Ave., Arlington, Mass. 02174
Filed Nov. 12, 1975, Ser. No. 631,065
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—218

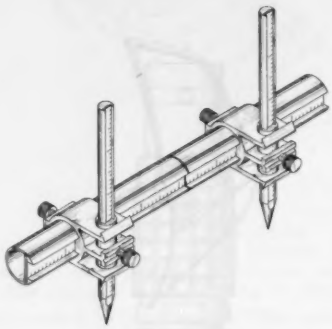


245,965
OXYGEN ANALYZER HOUSING
Harold R. Havstad, Eagle Point, Oreg., assignor to Hudson Oxygen Therapy Sales Company
Filed Mar. 26, 1976, Ser. No. 670,732
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—46

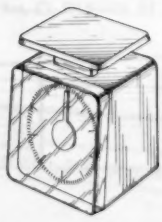


245,966
THERMOMETER
Henry Finkel, Westmount, Canada, assignor to International Business Relations Bureau Inc., Montreal, Canada
Filed Mar. 12, 1976, Ser. No. 666,572
Term of patent 7 years
Int. Cl. D10—*04*
U.S. Cl. D10—58

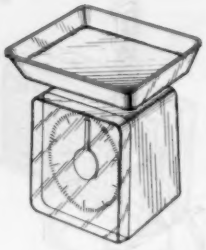
245,967
TRAMMEL GAUGE
Guy Norman Chartier, Toronto, Canada, assignor to Guy-Chart Tools Limited
Filed Jan. 5, 1976, Ser. No. 646,483
Claims priority, application Japan, July 31, 1975, 50-31430
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—61



245,968
HOUSEHOLD SCALE
Dana W. Mox, Elk Grove Village, Ill., assignor to Hanson Limited, Sligo, Ireland
Filed Jan. 19, 1976, Ser. No. 650,526
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—91

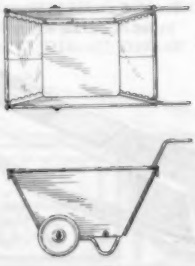


245,969
KITCHEN SCALE BALANCE
Dana W. Mox, Elk Grove Village, Ill., assignor to Hanson Limited, Sligo, Ireland
Filed Jan. 19, 1976, Ser. No. 650,527
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—91



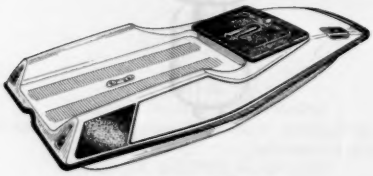
245,970
ANEMOMETER TRANSDUCER
R. A. Simerl, 528 Epping Forest Road, Annapolis, Md. 21401
Filed Jan. 27, 1976, Ser. No. 652,763
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—103

245,971
COLLAPSIBLE CART
Melvin R. Martens, 406 N. Weaver, Hesston, Kans. 67062
Filed Aug. 13, 1976, Ser. No. 714,082
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—24

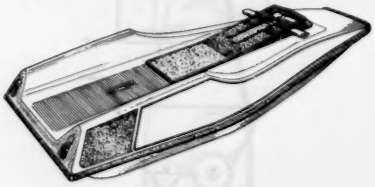


245,972
LIFTING TONGS
Gary Wayne Kifer, 1723 S. 9th East, Salt Lake City, Utah 84105
Filed Apr. 29, 1976, Ser. No. 681,324
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—54

245,973
PERSONAL WATER CRAFT
Anastasios J. Vasilatos, and Albert L. Nagele, both of Wilmette, Ill., assignors to A.V./American Ventures, Inc.
Continuation-in-part of Ser. No. 591,618, June 30, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 728,441
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—69

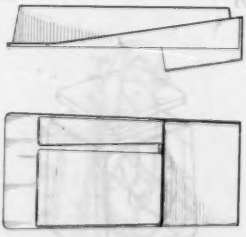


245,974
PERSONAL WATER CRAFT
Anastasios J. Vasilatos, and Albert L. Nagele, both of Wilmette, Ill., assignors to A.V./American Ventures, Inc.
Continuation-in-part of Ser. No. 591,619, June 30, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 728,442
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—69



245,975
CAR FRONT SIDE DOOR PANEL
Michel Tixier, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France
Filed July 21, 1975, Ser. No. 597,872
Claims priority, application France, Feb. 20, 1975, 75.73636
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—196

245,976
CHARGING UNIT FOR PORTABLE ELECTRONIC THERMOMETER
George H. Schmidt, Douglaston, N.Y., assignor to Arbrook, Inc., Arlington, Tex.
Filed Oct. 8, 1975, Ser. No. 620,900
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—6



245,977

ELECTRICAL CONNECTOR

Leon Mouttet, Lonay, Switzerland, assignor to Interlemo Holding S.A., Coire, Switzerland

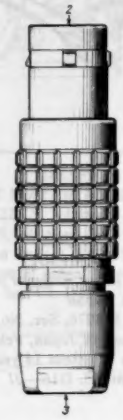
Filed Oct. 9, 1975, Ser. No. 620,941

Claims priority, application Switzerland, July 8, 1975, 61301/75

Term of patent 14 years

Int. Cl. D13—*03*

U.S. Cl. D13—24



245,978

COMBINED TAPE RECORDER, TUNER AND AMPLIFIER

Toshimasa Akazawa, Yao, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

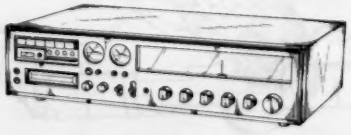
Filed Mar. 17, 1976, Ser. No. 667,800

Claims priority, application Japan, Sept. 19, 1975, 50-38370

Term of patent 14 years

Int. Cl. D14—*01, 03*

U.S. Cl. D14—5



245,979

PORTABLE RADIO RECEIVER

Kiyoshi Fukuda, and Kimio Takano, both of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Sept. 4, 1975, Ser. No. 610,369

Claims priority, application Japan, Mar. 13, 1975, 50-10106

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D14—68

245,980

PORTABLE RADIO RECEIVER

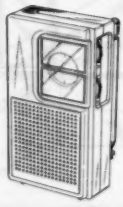
Toshio Igo, Katano, and Hironosuke Koda, Kyoto, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 10, 1975, Ser. No. 639,506

Term of patent 14 years

Int. Cl. D14—*03*

U.S. Cl. D14—68



245,981

DIGITAL CLOCK RADIO

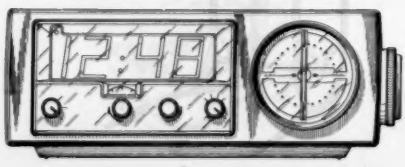
Ellen V. B. Ludwick, Mountain View, Calif., assignor to General Electric Company

Filed Mar. 18, 1976, Ser. No. 668,235

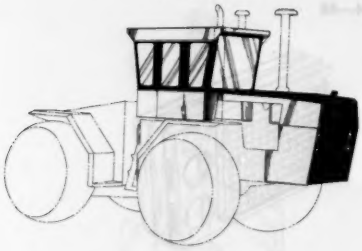
Term of patent 14 years

Int. Cl. D14—*03*; D10—*01*

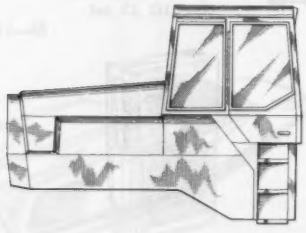
U.S. Cl. D14—73



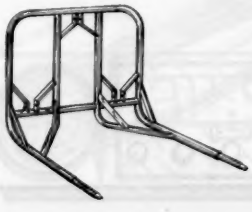
245,982
COMBINED TRACTOR CAB AND HOOD
Charles W. Pelly, Calabasas, Calif., assignor to Steiger Tractor Inc., Fargo, N. Dak.
Filed Aug. 9, 1976, Ser. No. 713,127
Term of patent 7 years
Int. Cl. D15—*03*
U.S. Cl. D15—23



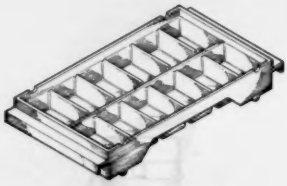
245,983
COMBINED TRACTOR BODY AND CAB
Lawrence J. Stone, Livonia, and Thomas M. Denny, Farmington, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.
Filed July 12, 1976, Ser. No. 704,596
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—30



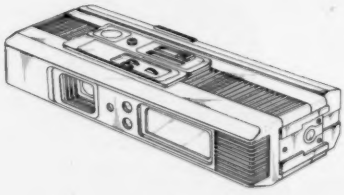
245,984
BALE CARRIER ATTACHMENT FOR TRACTORS OR THE LIKE
William D. Priefert, Mount Pleasant, Tex., assignor to Priefert Mfg. Co., Inc.
Filed Dec. 10, 1975, Ser. No. 639,357
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—32



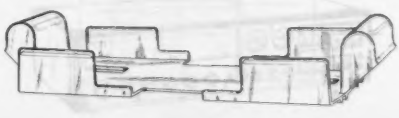
245,985
ICE CUBE TRAY
Delbert K. Talbert, 4214 W. 120th St., Apt. D, Hawthorne, Calif. 90250
Filed May 17, 1976, Ser. No. 686,752
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—90



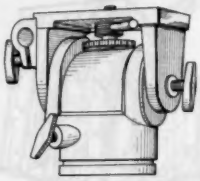
245,986
CAMERA
Hiroshi Fukuda, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Filed May 3, 1976, Ser. No. 682,870
Claims priority, application Japan, Feb. 4, 1976, 51-3293
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—06



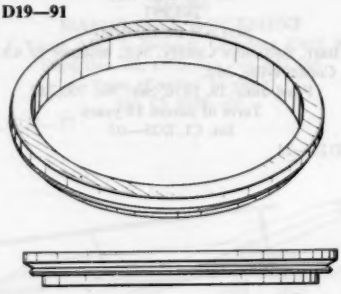
245,987
COPY TRAY
Richard Joseph Olson, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 30, 1976, Ser. No. 671,868
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—32



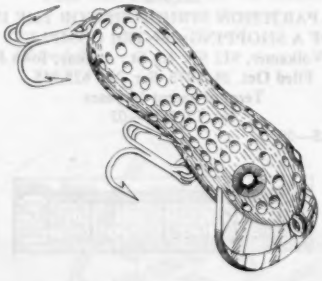
245,988
TRIPOD HEAD
Robert Eric Miller, Rose Bay, Australia, assignor to Miller-Universal (AUST) Pty. Ltd., Australia
Filed Sept. 11, 1975, Ser. No. 612,582
Claims priority, application Australia, Mar. 19, 1975, 66654/75
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—46



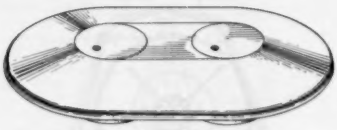
245,989
SHEET MATERIAL HOLDER
Geronimo A. Dango, 1226 S. Adams St., Glendale, Calif. 91209
Division of Ser. No. 398,580, Sept. 19, 1973, Pat. No. D.236,342.
This application June 5, 1975, Ser. No. 583,995
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—91



245,990
FISHING LURE
Carl R. Cordell, Jr., 215 Idlewood Drive, Hot Springs, Ark. 71901
Filed Jan. 28, 1977, Ser. No. 763,605
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

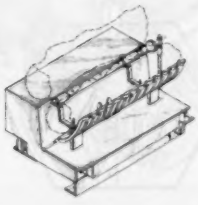


245,991
COLLAR FOR GAS TANK FILLING PIPES OF SERVICE STATIONS
Jean Guy Gravel, 263 boulevard Levesque, Apt. 2, Pont-Viau, Laval, Quebec, Canada
Filed July 2, 1976, Ser. No. 702,278
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—41

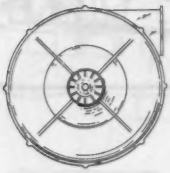


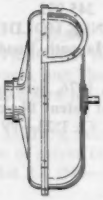
245,992
INCENSE HOLDER
Morton A. Gruber, 188 Haypath Road, Old Bethpage, N.Y. 11804
Filed Aug. 20, 1976, Ser. No. 716,273
Term of patent 14 years
Int. Cl. D23—*99*
U.S. Cl. D23—78

245,993
COMBINED BURNER BLOWER AND SUPPORT STAND FOR SIMULATED LOGS
Robert K. Anderson, and Richard L. Stuver, both of 1380 N. 380 West, Provo, Utah 84601
Filed July 25, 1975, Ser. No. 599,318
Term of patent 14 years
Int. Cl. D23—*03;* D7—*08*
U.S. Cl. D23—93



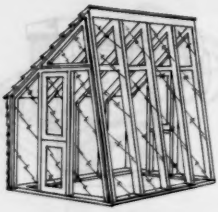
245,994
BLOWER
Donald L. Olson, Minneapolis, Minn., assignor to Tennant Company, Minneapolis, Minn.
Filed Aug. 18, 1975, Ser. No. 605,405
Term of patent 14 years
Int. Cl. D23—*99*
U.S. Cl. D23—162





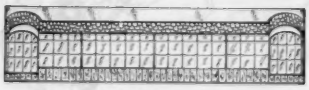
245,995
CONVERTIBLE MODULAR MOBILE HOME
Earle Sumner Draper, Jr., 4630 Town & Country Drive, Charlotte, N.C. 28211
Filed Nov. 5, 1975, Ser. No. 629,045
Term of patent 3½ years
Int. Cl. D25—*03*
U.S. Cl. D25—17

245,996
GREENHOUSE
William W. Lukens, 407 Mill Creek Road, Wynnewood, Pa. 19096
Filed Dec. 24, 1975, Ser. No. 644,062
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—15

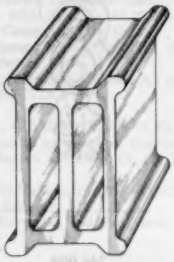


245,997
SOLAR BUILDING
Irwin R. Barr, Baltimore County, Md., assignor to AAI Corporation, Cockeysville, Md.
Filed June 29, 1976, Ser. No. 700,710
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21

245,998
FLORIST PARTITION STRUCTURE FOR THE INSIDE OF A SHOPPING CENTER COMPLEX
Richard L. Volkamer, 912 SE. 4th St., Ankeny, Iowa 50022
Filed Oct. 28, 1975, Ser. No. 625,945
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—59

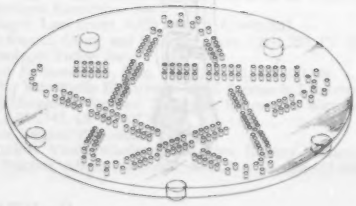


245,999
SUPPORT BLOCK FOR CHEMICAL TOWER PARKING
Ralph F. Strigle, Jr., Akron, and Frank D. Moore, Tallmadge, both of Ohio, assignors to Norton Company, Worcester, Mass.
Filed Feb. 12, 1975, Ser. No. 549,315
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—91

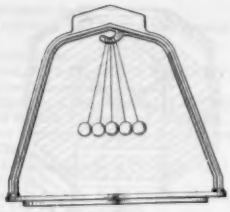


246,000
MANICURING IMPLEMENT
George J. Yacos, 1362 E. Bennett, Glendora, Calif. 91740
Filed Dec. 22, 1975, Ser. No. 643,148
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—57

246,001
CRIBBAGE BOARD
Roy W. Montgomery, 7538 31st Ave. NW., Seattle, Wash. 98117
Filed Mar. 26, 1976, Ser. No. 670,634
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 TT

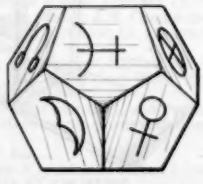


246,002
APPARATUS FOR PLAYING A GAME
Dieter Hahne, Munich; Jürgen Stöhr, Eching, and Hans-R. Ulrich, Wuppertal, all of Germany, assignors to Anjar, Inc., New York, N.Y.
Filed Oct. 2, 1975, Ser. No. 619,013
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 BB

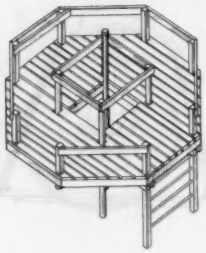


246,003
GOLF CLUB
Asao Shimada, 1021, Niihori, Hidaka-cho, Iruma, Saitama, Japan
Filed Jan. 2, 1976, Ser. No. 646,034
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GS

246,004
DODECAHEDRON ASTROLOGICAL DIE
Lois Goff, Santa Cruz, Calif., assignor to Astro-Die, Ltd., Santa Clara, Calif.
Filed Sept. 2, 1975, Ser. No. 609,742
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 DT



246,005
CHILD RECREATION STRUCTURE
Robert L. Callecod, Long Lake, Minn., assignor to Recreation Systems Co., North Aurora, Ill.
Filed June 4, 1976, Ser. No. 693,112
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 H



246,006
BALL ROLLING GAME STICK
Alvin L. Burr, and Virginia H. Burr, both of P.O. Box 461, Ridgefield, Wash. 98642
Filed Apr. 21, 1976, Ser. No. 678,945
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 HP

246,007
SERIAL PRINTER OR SIMILAR ARTICLE
John Warren Carroll, Ames St., Pepperell, Mass. 01463
Filed Apr. 5, 1976, Ser. No. 673,766
Term of patent 14 years
Int. Cl. D18—*02*
U.S. Cl. D64—11 R

246,008
CANDLE
Masashi Tanikawa, Kameyama, Japan, assignor to Kameyama Candle Co., Ltd., Kameyama, Japan
Filed Nov. 12, 1975, Ser. No. 631,362
Term of patent 14 years
Int. Cl. D26—*04*
U.S. Cl. D73—1 R

246,009
CANDLE
Masashi Tanikawa, Kameyama, Japan, assignor to Kameyama Candle Co., Ltd., Kameyama, Japan
Filed Nov. 12, 1975, Ser. No. 631,363
Term of patent 14 years
Int. Cl. D26—*04*
U.S. Cl. D73—1 R

246,010
CANDLE
Masashi Tanikawa, Kameyama, Japan, assignor to Kameyama Candle Co., Ltd., Kameyama, Japan
Filed Nov. 12, 1975, Ser. No. 631,389
Term of patent 14 years
Int. Cl. D26—*04*
U.S. Cl. D73—1 R

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF OCTOBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. E. Staley Manufacturing Company: *See*—
Verbanac, Frank, 4,052,226, Cl. 127-29.000.

A. J. Sackett & Sons Company, The: *See*—
Sackett, Walter James, Sr., 4,051,948, Cl. 198-550.000.

A P Products Incorporated: *See*—
Tengler, John N.; Mesaros, Stephen A.; and Venaleck, John T., 4,052,117, Cl. 339-17.0CF.

A-T-O Inc.: *See*—
Carter, Sidney T., 4,052,050, Cl. 271-18.300.

Aaron, Gabrielle Leonie, to Anciens Etablissements Rene Aaron. Diaper panties for babies. 4,051,854, Cl. 128-284.000.

AB Casco: *See*—
Ohrn, Gosta Arvid Valdemar, 4,051,635, Cl. 51-108.00R.

Abbott Laboratories: *See*—
Herrin, Thomas Raymond; and Fairgrieve, John Scott, 4,052,439, Cl. 560-129.000.

Abe, Iwao: *See*—
Sakakibara, Kouzou; Abe, Iwao; Yokoyama, Takushi; and Matuokadeclare, Kazuyuki, 4,052,462, Cl. 260-604.00R.

Acevedo, Ignacio: *See*—
Estrada, Otto, 4,051,751, Cl. 82-12.000.

ACS Industries, Inc.: *See*—
Botvin, George B., 4,052,238, Cl. 156-148.000.

Actus, Inc.: *See*—
Bao, Frank W.; Hummeldorf, James L.; and Parker, Stephen D., 4,051,713, Cl. 73-9.000.

Adachi, Kizo: *See*—
Yamaguchi, Susumu, 4,052,669, Cl. 324-151.00A.

Adamovske strojirny, narodni podnik: *See*—
Jiruse, Jaroslav; and Rozsypal, Josef, 4,052,055, Cl. 271-268.000.

Adams, Stewart S.; Armitage, Bernard J.; and Nicholson, John S., to Boots Company Limited, The. Trihalosubstituted biphenylyl propionic acids. 4,052,514, Cl. 424-316.000.

Addressograph Multigraph Corporation: *See*—
Arena, Ronald D.; and Lowry, Eric G., 4,052,327, Cl. 252-141.000.

Affiliated Medical Research, Inc.: *See*—
Gadekar, Shreekrishna M., 4,052,509, Cl. 424-263.000.

Agency of Industrial Science & Technology: *See*—
Chikamori, Kunio, 4,052,274, Cl. 204-129.430.

AGFA-Gevaert, A.G.: *See*—
Credner, Hans Heinrich; Lassig, Wolfgang; Meier, Ernst; Ranz, Erwin; Schleger, Siegfried; and Schranz, Karl-Wilhelm, 4,052,213, Cl. 96-66.300.
Moll, Franz; and Rosenhahn, Lothar, 4,052,215, Cl. 96-84.00R.
Sobel, Johannes; Klein, Alfons; Nittel, Fritz; and Wedemeyer, Karlfried, 4,052,216, Cl. 96-84.0UV.

Aiba, Masahiko: *See*—
Fujimoto, Isao; Kasubuchi, Takeshi; Aiba, Masahiko; and Shimazawa, Yoichi, 4,051,945, Cl. 197-176.000.

Airco, Inc.: *See*—
Phillips, Wayne E.; and Scheuermann, Glen R., 4,051,695, Cl. 64-8.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Fukumoto, Ryoichi; and Igarashi, Toshiro, 4,051,632, Cl. 49-348.000.

Aizenberg, Sergei Arnoldovich: *See*—
Baburin, Sergei Vyacheslavovich; Akimov, Vasily Ivanovich; Gorbushin, Vladimir Alexandrovich; Muraviev, Alexandr Petrovich; Nepein, Valery Nikolaevich; Frolov, Mikhail Vladimirovich; Aizenberg, Sergei Arnoldovich; Golovko, Evgeny Mikhailovich; Kamenev, Alexandr Fedorovich; and Sergeev, Igor Alexandrovich, 4,051,576, Cl. 19-156.000.

Akimov, Vasily Ivanovich: *See*—
Baburin, Sergei Vyacheslavovich; Akimov, Vasily Ivanovich; Gorbushin, Vladimir Alexandrovich; Muraviev, Alexandr Petrovich; Nepein, Valery Nikolaevich; Frolov, Mikhail Vladimirovich; Aizenberg, Sergei Arnoldovich; Golovko, Evgeny Mikhailovich; Kamenev, Alexandr Fedorovich; and Sergeev, Igor Alexandrovich, 4,051,576, Cl. 19-156.000.

Aktiebolaget Electrolux: *See*—
Enger, Lars Sivert, 4,051,694, Cl. 62-490.000.
Schwartz, Osten; and Vukotic, Milos, 4,051,727, Cl. 73-306.000.

Aktiebolaget Tudor: *See*—
von Krusenstierna, Otto, 4,052,541, Cl. 429-233.000.

A.G. fur industrielle Elektronik AGIE Losone b. Locarno: *See*—
Peddinghaus, Gunther; Neumann, Harry; and Wittenstein, Horst, 4,051,747, Cl. 76-107.00R.

Akulov, Evgeny Alexandrovich: *See*—
Borisov, Vasily Nikolaevich; Akulov, Evgeny Alexandrovich; and Solovei, Alexei Ivanovich, 4,052,518, Cl. 426-482.000.

Akzona, Incorporated: *See*—
Roskott, Lodewijk; and Schroeder, Arnold, 4,052,465, Cl. 260-610.00R.

Akzona Incorported: *See*—
Griset, Ernest, Jr., 4,051,660, Cl. 57-140.0BY.

Aladdin Industries, Incorporated: *See*—
Wyatt, William B., 4,052,589, Cl. 219-400.000.

Albareda, Angel Ramon Terrado; and Schoellen, Joseph, to Goodyear Tire & Rubber Company, The. Stitcher for tire building. 4,052,246, Cl. 156-412.000.

Albers, Teunis. Locking stanchion for cattle. 4,051,813, Cl. 119-148.000.

Alexa, Miloslav: *See*—
Reichrt, Vaclav; Smalek, Josef; Pedlik, Miroslav; and Alexa, Miloslav, 4,052,151, Cl. 432-115.000.

Allied Chemical Corporation: *See*—
Figiel, Francis J., 4,052,328, Cl. 252-171.000.
Mears, Whitney H.; and Orfeo, Sabatino R., 4,052,555, Cl. 174-17.0GF.
Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,052,470, Cl. 260-653.700.
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,052,468, Cl. 260-648.00F.
Polk, Donald E.; Ray, Ranjan; and Davis, Lance A., 4,052,201, Cl. 75-124.000.

Alps Electric Co., Ltd.: *See*—
Suzuki, Takeo; Inoue, Ikutaro; Tamai, Hideo; and Aoki, Masatsugu, 4,051,942, Cl. 197-49.000.

Aluminium Pechiney: *See*—
Sala, Jean-Marie, 4,052,288, Cl. 204-243.00R.

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Dickson, Thomas David, Jr., 4,052,019, Cl. 242-47.000.
Higuchi, Takeru; and Hussain, Anwar, 4,052,505, Cl. 424-14.000.

Amancharla, Amareswar; and Young, Carter R., to Otis Engineering Corporation. Well bore liner hanger. 4,051,896, Cl. 166-123.000.

Amann, Charles A., to General Motors Corporation. Exhaust back pressure control. 4,051,821, Cl. 123-97.00B.

Ambrus, Gabor; Barta, Istvan; Mehesfalvi, Zsuzsanna, nee Vajna; and Horvath, Gyula, to Gyogyszerkutato Intezet. Thiazole derivatives and processes for preparing the same. 4,052,407, Cl. 260-302.00R.

Amchem Products, Inc.: *See*—
Waldrum, John E., 4,051,805, Cl. 118-58.000.

American Cyanamid Company: *See*—
Kreahling, Robert P.; Casey, Donald J.; and Goldenberg, David Z., 4,052,500, Cl. 264-290.00T.
Kreahling, Robert P.; Casey, Donald J.; and Goldenberg, David Z., 4,052,501, Cl. 264-290.00T.
Schrider, Michael Stanley; and Levy, Stephen David, 4,052,381, Cl. 260-206.000.
Susi, Peter Vincent; and Oppelt, John Christian, 4,052,361, Cl. 260-45.80N.

American Optical Corporation: *See*—
Chang, Leei; and Verburg, John A., 4,052,520, Cl. 427-164.000.

AMF Incorporated: *See*—
Arthur, Ronald H., 4,052,579, Cl. 200-159.00A.
Stanish, Ronald J., 4,052,580, Cl. 200-159.00R.
Uhlinger, Charles E.; and Splittstoesser, Clair D., 4,051,648, Cl. 56-255.000.

AMP Incorporated: *See*—
Scheingold, William Samuel; and Youngfleish, Frank Christian, 4,052,118, Cl. 339-17.0CF.

Ampex Corporation: *See*—
Coleman, Charles Hubert, Jr., 4,052,740, Cl. 360-30.000.

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Aaron, Gabrielle Leonie, 4,051,854, Cl. 128-284.000.

Anderl, Richard F.; and Tienor, Lawrence J., to National Presto Industries, Inc. Electric appliance with intermittently staked sheathed heating element. 4,052,590, Cl. 219-438.000.

Andersen, Bjorn, to Maxman AG. System for control of speech direction in duplex telephone circuits. 4,052,562, Cl. 179-1.0HF.

Andersen, Hans Skov, to Danfoss A/S. Control device for a hydraulically operated consumer. 4,051,868, Cl. 137-596.130.

Anderson, Clifford: *See*—
Mason, Leonard; and Anderson, Clifford, 4,051,696, Cl. 64-23.000.

Anderson, Joseph W., to Corning Glass Works. Contouring glass seal edge. 4,052,184, Cl. 65-102.000.

Anderson, Paul S.; Christy, Marcia E.; and Ponticello, Gerald S., to Merck & Co., Inc. Heterocyclic dihydroanthracen imines. 4,052,508, Cl. 424-258.000.

Anderson, Robert L.: *See*—
McDermott, James A.; Anderson, Robert L.; and Loomans, Maurice E., 4,052,515, Cl. 424-343.000.

Anderson, Walter F., to Diamond International Corporation. Pump sprayer. 4,051,983, Cl. 222-321.000.
Andrews, Richard A.; and Noakes, Thomas E., to H. O. Trerice Co. Condition responsive indicating instrument. 4,051,730, Cl. 73-416.000.
Andrus, Paul W.; and Carter, Ronald A., to Western Electric Co. Die stem heating. 4,051,705, Cl. 72-60.000.
Angus, James W., to Sun Chemical Corporation. Constant torque multiple drum counter. 4,052,597, Cl. 235-92.00C.
Anzai, Masayasu, to Hitachi, Ltd. Electrophotography. 4,052,206, Cl. 96-1.00R.
Aoki, Masatsugu: *See*—
Suzuki, Takeo; Inoue, Ikutaro; Tamai, Hideo; and Aoki, Masatsugu, 4,051,942, Cl. 197-49.000.
Aoyagi, Takaaki: *See*—
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,052,449, Cl. 260-519.000.
Appleby, Paul E.; Houck, Stanley J.; and Nash, Richard B., to Goodyear Tire & Rubber Company, The. Closed torus tire. 4,052,237, Cl. 156-117.000.
Applied Power Inc.: *See*—
Peterson, Harold Severin, 4,051,881, Cl. 144-288.00A.
Applied Research & Development Company: *See*—
Rogers, Joe M., 4,051,918, Cl. 181-119.000.
Arai, Hajime; and Ohnuma, Kiyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fluid pressure control system for a hydraulic transmission with a lock-up clutch. 4,051,932, Cl. 192-3.300.
Arai, Yasuyuki: *See*—
Yamada, Tatsunori; Mori, Shigeru; Kato, Kaoru; Arai, Yasuyuki; and Sakitani, Katumi, 4,051,888, Cl. 165-1.000.
Araki, Kenji: *See*—
Nakaoka, Kazuhide; Araki, Kenji; Takada, Yoshikazu; Osaka, Shinobu; and Hirogami, Katsuhiko, 4,052,235, Cl. 148-156.000.
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Colling, Joseph; Heintz, Carlo; and Unbekand, Alfred, 4,052,044, Cl. 266-225.000.
Arena, Ronald D.; and Lowry, Eric G., to Addressograph Multigraph Corporation. Compositions for eradicating electrophotographic images from translucent paper. 4,052,327, Cl. 252-141.000.
Arizona Chemical Company: *See*—
Booth, James William, 4,052,549, Cl. 526-237.000.
Armitage, Bernard J.: *See*—
Adams, Stewart S.; Armitage, Bernard J.; and Nicholson, John S., 4,052,514, Cl. 424-316.000.
Armstrong, Leonard J.: *See*—
Kenny, Shaun S.; and Armstrong, Leonard J., 4,052,035, Cl. 251-14.000.
Arn, Robert M., to Hayden/Arn Productions Limited. Operating switch and retainer for digital watch cases. 4,051,665, Cl. 58-50.00R.
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., to Goodyear Aerospace Corporation. Battery condition monitoring method and apparatus. 4,052,717, Cl. 340-249.000.
Arnone, Charles V. Air leakage indicator device for a spare tire. 4,051,803, Cl. 116-34.00R.
Aronson, Bernard S.; and Murphy, James A., to Corning Glass Works. Method of anodizing porous tantalum. 4,052,273, Cl. 204-37.00R.
Arthur, Ronald H., to AMF Incorporated. Momentary contact switch having pivoting actuator mounted on switch base. 4,052,579, Cl. 200-159.00A.
Arvanitakis, Kostas Savas. Method and apparatus for clarifying liquids by straining. 4,052,305, Cl. 210-79.000.
Arvin Industries, Inc.: *See*—
Stratton, Boyd Lehman, 4,052,743, Cl. 360-99.000.
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Gleyze, Jean; Dupeuble, Jean-Claude; and Forin, Roger, 4,051,650, Cl. 57-34.0HS.
Asahara, Nakaba; Asai, Yasuhiko; and Yasue, Kenji, to Unitika Ltd. Resin composition and a process for preparing same. 4,052,481, Cl. 260-857.0PE.
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Miyata, Junjiro; and Kikuchi, Yasushi, 4,051,771, Cl. 99-276.000.
Asahi Glass Company Ltd.: *See*—
Nagano, Kentaro; Nomaki, Koji; Kutsukake, Yukinori; and Nanao, Junji, 4,052,691, Cl. 338-35.000.
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Ashley, Eugene, to General Electric Company. Liquid propellant weapon system. 4,051,762, Cl. 89-7.000.
Associated Portland Cement Manufacturers Limited, The: *See*—
Pennell, Anthony Robin; Dover, Peter Leslie; and Davies, William Martin, 4,052,148, Cl. 432-1.000.
Atlantic Richfield Company: *See*—
Segal, Jack S.; and Trapp, Harold D., 4,051,724, Cl. 73-198.000.
Zajacek, John G.; McCoy, John J.; and Fuger, Karl E., 4,052,454, Cl. 260-553.00A.
Atwood, John G.; Marshall, Hamilton W., Jr.; and Heinz, Peter H., to Perkin-Elmer Corporation, The. Kinetic analyzer. 4,052,161, Cl. 23-230.00R.
Audet, Francois. Bowel movement energizer system. 4,051,560, Cl. 4-1.000.
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Molay, Ira, 4,052,561, Cl. 179-1.0AT.
Auer, Siegfried O.: *See*—
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Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., to BASF Wyandotte Corporation. Process for the preparation of polyurethane foams. 4,052,345, Cl. 260-2.5AP.
Austin, Kenneth L.: *See*—
Hill, Homer G.; and Austin, Kenneth L., 4,052,257, Cl. 162-156.000.
Automatic Terminal Information Systems, Inc.: *See*—
Collins, Jerry Alan, Sr.; and Spaw, Robert Lynn, 4,052,703, Cl. 364-200.000.
Avco Corporation: *See*—
Mir, Leon, 4,052,297, Cl. 209-1.000.
Avon Products, Inc.: *See*—
Ohmeis, Peter M.; Gehring, Robert L.; and Hahn, Roger A., 4,051,878, Cl. 141-82.000.
Ayers, Herbert D. Toothbrush. 4,051,571, Cl. 15-167.00R.
Aylward, Paul T., to Bethlehem Steel Corporation. Deep hardening machinable aluminum killed high sulfur tool steel. 4,052,230, Cl. 148-2.000.
Aziende Colori Nazionali Affini ACNA S.p.A.: *See*—
Gaetani, Ermanno; and Ponzini, Sandro, 4,052,380, Cl. 260-169.000.
Papa, Sisto Sergio; and Condo, Antonino, 4,052,375, Cl. 260-145.00C.
B. F. Goodrich Company, The: *See*—
Kuts, Mathew, 4,052,245, Cl. 156-405.00R.
Nickerson, Malcolm H.; and Rinker, William R., 4,051,769, Cl. 98-43.00R.
Baburin, Sergei Vyacheslavovich; Akimov, Vasily Ivanovich; Gorbushin, Vladimir Alexandrovich; Muraviev, Alexandr Petrovich; Nepein, Valery Nikolaevich; Frolov, Mikhail Vladimirovich; Aizenberg, Sergei Arnoldovich; Golovko, Evgeny Mikhailovich; Kamenev, Alexandr Fedorovich; and Sergeev, Igor Alexandrovich. Apparatus for aerodynamically forming a fibrous sheet material. 4,051,576, Cl. 19-156.000.
Baca, Joseph Philip; and Marino, Peter Thomas, to International Business Machines Corporation. Track seeking and following. 4,052,741, Cl. 360-77.000.
Bachand, Carol: *See*—
Monkovic, Ivo; Bachand, Carol; and Wong, Henry, 4,052,389, Cl. 544-89.000.
Bachass, Arjun S.: *See*—
Smith, Kay D.; Bachass, Arjun S.; and Black, Francis B., 4,052,702, Cl. 364-200.000.
Bailey, Edward A., to Joy Manufacturing Company. Clamp. 4,052,047, Cl. 269-238.000.
Bailey Meter Company: *See*—
Bohl, Thomas L.; and Visdos, Leonard J., 4,051,731, Cl. 73-422.00R.
Bake, Earl A.; and Schoeneweis, E. Frederick, to Rockwell International Corporation. Valve positioning handle. 4,051,866, Cl. 137-556.300.
Baker, Don R.; and Walker, Francis H., to Stauffer Chemical Company. N-(1,1 Substituted acetonitrilo)-α-(3,5-substituted phenoxy) alkyl amides. 4,052,432, Cl. 260-465.00D.
Baker, Frederick G.; and Eaton, David L., to Corning Glass Works. Suspendable porous glass particles. 4,052,010, Cl. 241-20.000.
Baker, Harry L. Bogie-wheel shaft lubrication system. 4,052,111, Cl. 305-14.000.
Baker International Corporation: *See*—
Goad, Bobby F., 4,051,894, Cl. 166-73.000.
Baker, Thomas G.; and Shute, Raymond J., to Stepan Chemical Company. Process for the production of commercial alpha olefin sulfonates. 4,052,431, Cl. 260-513.00T.
Baker, William J.; and Galloup, Clifford L., to Gardner-Denver Company. Conductor wrapping bit. 4,051,875, Cl. 140-124.000.
Bale, Richard W., to General Electric Company. Methods for setting insulators and pressing end turns. 4,051,595, Cl. 29-596.000.
Balistreri, Thomas W.: *See*—
Manschot, James G.; Mather, Byron L.; and Balistreri, Thomas W., 4,051,578, Cl. 251-4.000.
Balkcom, Robby P., to Lawrence Peska Assoc., Inc., a part interest. Break down game racket. 4,052,060, Cl. 273-73.00R.
Balogh, Gyula: *See*—
Szantay, Csaba; Vedres, Andras; Thuranszky, Karoly; Balogh, Gyula; and Vedres nee Kozma, Maria, 4,052,403, Cl. 260-288.0CF.
Banker, William W., to General Signal Corporation. Fluid pressure brake system with electronically assisted application and release. 4,052,110, Cl. 303-36.000.
Banyaszati Kutato Intezet: *See*—
Meckl, Ferenc; and Piuk, Peter, 4,051,718, Cl. 73-71.200.
Bao, Frank W.; Hummeldorf, James L.; and Parker, Stephen D., to Actus, Inc. Friction measuring and testing method and apparatus. 4,051,713, Cl. 73-9.000.
Barber, John A.; Dion, C. Norman; and James, Richard N., to Dysan Corporation. Flexible recording disk with improved spindle mounting means. 4,052,750, Cl. 360-135.000.
Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See*—
Burow, Burghard, 4,052,498, Cl. 264-261.000.
Lorenz, Hellmut; and Bunger, Heino, 4,051,655, Cl. 57-77.400.
Wahlen, Antonius; and Otten, Klaus-Detlef, 4,051,651, Cl. 57-35.000.
Barnes, Carl Kenneth; and Barnes, John Owen, to Jack Barnes Engi-

neering, Inc. Machine for printing measuring tapes. 4,051,774, Cl. 101-37.000.

Barnes, John Owen: *See*—
Barnes, Carl Kenneth; and Barnes, John Owen, 4,051,774, Cl. 101-37.000.

Barrington, Clive Seymour, to Rolls-Royce (1971) Limited. Engine useful life measuring device. 4,051,720, Cl. 73-116.000.

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Ambrus, Gabor; Barta, Istvan; Mehesfalvi, Zsuzsanna, nee Vajna; and Horvath, Gyula, 4,052,407, Cl. 260-302.00R.

Bartling, Gerhard, to SKF Kugellagerfabriken GmbH. Open end spinning machine. 4,051,654, Cl. 57-58.890.

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Baumann, Hans, 4,052,374, Cl. 260-145.00A.
Dockner, Toni; Wallis, Albrecht; Fikentscher, Rolf; Thomas, Rainer; and Herzog, Reinhard, 4,052,384, Cl. 260-239.00E.
Fuerst, Ernst; Gerendas, Jozsef; Rokohl, Rudolf; Fikentscher, Rolf; and Helfert, Herbert, 4,052,159, Cl. 8-169.000.
Junge, Helmut; and Kurtz, Walter, 4,052,371, Cl. 260-154.000.
Junge, Helmut; and Kurtz, Walter, 4,052,377, Cl. 260-154.000.
Kast, Hellmut; and Dunkelmann, Guenter, 4,052,398, Cl. 260-256.40F.
Krabetz, Richard; Engelbach, Heinz; Lebert, Ulrich; Frey, Walter; Duembgen, Gerd; Thiessen, Fritz; and Willersinn, Carl-Heinz, 4,052,450, Cl. 260-533.00N.
Mayer, Kurt, 4,052,415, Cl. 260-343.400.
Schoenafinger, Eduard; and Leutner, Bernd, 4,052,326, Cl. 252-62.560.

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Heckl, Leonhard; Liedek, Egon; and Ruff, Wolfgang, 4,052,378, Cl. 260-155.000.

BASF Wyandotte Corporation: *See*—
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,052,345, Cl. 260-2.5AP.

Bastian, Jean-Michel, to Sandoz Ltd. Benzo cycloheptathiophene carboxylic acid derivatives. 4,052,412, Cl. 260-332.20A.

Battigelli, Jean A.: *See*—
Levecque, Marcel; and Battigelli, Jean A., 4,052,183, Cl. 65-3.00C.

Batzer, Hans: *See*—
Habermeier, Jurgen; Batzer, Hans; and Porret, Daniel, 4,052,366, Cl. 260-63.00R.

Baum, Walter; and Brendel, Hans Helmut, to USM Corporation. Leather softening machines. 4,051,701, Cl. 69-33.000.

Baum, Werner, to P.E.I. Incorporated. Turbine drill for drilling at great depths. 4,051,909, Cl. 175-93.000.

Baumann, Hans, to BASF Aktiengesellschaft. Unsymmetrical 1:2-chromium complexes containing an azo compound and an azomethine compound. 4,052,374, Cl. 260-145.00A.

Baxter, Denmer Dix; and Reeves, Charles Michael, to Martin Marietta Corporation. Walsh function signal scrambler. 4,052,565, Cl. 179-1.50S.

Bayer Aktiengesellschaft: *See*—
Bein, Hans-Samuel; and Klauke, Erich, 4,052,386, Cl. 260-242.200.
Buchel, Karl Heinz; Regel, Erik; and Plempel, Manfred, 4,052,409, Cl. 548-341.000.
Dickore, Karlfried; Engels, Hans Dieter; Kratzer, Hans; and Merz, Walter, 4,052,460, Cl. 260-593.00H.
Dieterich, Dieter; and Markusch, Peter, 4,052,347, Cl. 260-2.5AK.
Ippen, Jakob; and Stuttgen, Friedel, 4,051,883, Cl. 152-324.000.
Mansmann, Manfred; and Brandle, Karl, 4,052,225, Cl. 106-302.000.
Neukam, Theo; Bentz, Francis; and Nischk, Gunther, 4,052,355, Cl. 260-30.200.
Schliebs, Reinhard; and Block, Hans-Dieter, 4,052,484, Cl. 260-927.00R.

Bayles, Wayne. Conversion kit for an automobile air conditioning unit. 4,051,768, Cl. 98-2.000.

Baylis, Anthony Basil: *See*—
Slinkard, William Earl; and Baylis, Anthony Basil, 4,052,417, Cl. 260-346.750.

Beal, Philip E. Educational world map game. 4,052,072, Cl. 273-134.0AC.

Beane, David J.; and Kaplan, Ronald M., to United Technologies Corporation. Forging method. 4,051,708, Cl. 72-354.000.

Beatrice Foods Co.: *See*—
Dian, Walter, 4,051,738, Cl. 74-217.00B.

Becker, August: *See*—
Namy, Gerald; Becker, August; and Trappe, Klaus, 4,052,196, Cl. 75-25.000.

Becker, Frederick R., III, to Metropolitan Wire Corporation. Bussing cart. 4,052,081, Cl. 280-79.300.

Beer, Henri Bernard, to Diamond Shamrock Technologies, S.A. Method of making an electrode having a coating containing a platinum metal oxide thereon. 4,052,271, Cl. 204-38.00A.

Behn, Rudolf: *See*—
Hoppe, Lutz; and Behn, Rudolf, 4,052,259, Cl. 162-164.0EP.

Behrens, Robert Nick, to Deere & Company. Neutral start and park brake safety interlock circuitry for a tractor. 4,051,915, Cl. 180-82.00A.

Behun, Eugene, to Xerox Corporation. Oil wetted fuser roll stripping apparatus. 4,052,150, Cl. 432-60.000.

Bein, Hans-Samuel; and Klauke, Erich, to Bayer Aktiengesellschaft. Reactive phthalocyanine dyestuffs containing a fluoropyrimidinyl group. 4,052,386, Cl. 260-242.200.

Beiter, Charles B.; and Hafner, Lee A., to M & T Chemicals Inc. Aqueous antifouling coating composition comprised of emulsified water-insoluble polymer and triphenyltin derivative. 4,052,354, Cl. 260-29.60M.

Bell, Rex R.; and Sandstrom, John W., to Integral Corporation. Cable insulation stripping apparatus. 4,051,749, Cl. 81-9.510.

Bell Telephone Laboratories, Incorporated: *See*—
DeNigris, Ernest Gerard; and Tutko, Albert John, 4,052,688, Cl. 337-213.000.
Plewes, John Travis, 4,052,204, Cl. 75-154.000.
Reznicek, Kurt, 4,052,584, Cl. 219-69.00M.

Bender, Malcolm F.: *See*—
Harakas, Nicholas K.; Fulton, Kent H.; Tierney, Paul A.; and Bender, Malcolm F., 4,052,524, Cl. 428-383.000.

Beneke, Jene A.; Otsuka, Tsuruo; Otsuka, Steven R.; and Sarkisian, Samuel G., to Verson Allsteel Press Company. Low inertia clutch and brake system. 4,051,933, Cl. 192-18.00A.

Bengtson, Torsten R.; and Haslbeck, Joseph, to International Servisport Corporation Ltd. Eye protectors. 4,051,557, Cl. 2-430.000.

Benimetzki, Eliezer. Power transmission collar. 4,052,078, Cl. 279-93.000.

Bentz, Francis: *See*—
Neukam, Theo; Bentz, Francis; and Nischk, Gunther, 4,052,355, Cl. 260-30.200.

Berardinelli, Frank M.; and Edelman, Robert, to Celanese Corporation. Reinforced flame retardant polyester composition having non-drip characteristics. 4,052,360, Cl. 260-40.00R.

Berenbaum, Morris B.: *See*—
Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,052,470, Cl. 260-653.700.
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,052,468, Cl. 260-648.00F.

Berge, Trygve. Mat conveyor. 4,051,565, Cl. 5-81.00B.

Bergen, Gary Richard, to Emhart Industries, Inc. Latch operating device including operating and latch connection improvements. 4,052,092, Cl. 292-172.000.

Berger, Irvin E. Quick release child's bicycle seat. 4,051,985, Cl. 224-32.00A.

Berger, Leo Joseph, Jr.; and Guequierre, Denis D., to Finite Filter Company. Composite coalescing filter tube. 4,052,316, Cl. 210-315.000.

Berggrin, Guntis Erikovich: *See*—
Giller, Solomon Aronovich; Venter, Karl Karlovich; Trushule, Margarita Aldonovna; Berggrin, Guntis Erikovich; Brinkmanis, Robert Avgustovich; Mikstais, Uldis Yanovich; and Stankevich, Paul Alexandrovich, 4,052,419, Cl. 260-347.400.

Bergstein Packaging Trust: *See*—
Bergstein, Robert M., 4,051,992, Cl. 229-21.000.

Bergstein, Robert M., to Bergstein Packaging Trust. Cylindrical display container formed from a flat blank. 4,051,992, Cl. 229-21.000.

Berkshire Leather Corporation: *See*—
Widdemer, John D., 4,051,552, Cl. 2-161.00A.

Berliner, Julius F. T., to Burnishine Products Inc. Sustained-release plant food. 4,052,190, Cl. 71-11.000.

Berly, Marcel, to H. Ernault-Somua. Machine tools. 4,051,750, Cl. 82-2.00R.

Bernard, Vincent E.: *See*—
Everman, Wayne F.; and Bernard, Vincent E., 4,051,753, Cl. 83-29.000.

Berndt, Willi: *See*—
Simnovec, Andre; Wiebe, Martin; and Berndt, Willi, 4,052,652, Cl. 318-476.000.

Berner, Klaus: *See*—
Rheinlander, Paul; Mahn, Gustav; Schulz, Klaus, deceased; Ruhland, Ingrid, legal representative; and Berner, Klaus, 4,052,043, Cl. 266-207.000.

Berry Metal Company: *See*—
Rymarchyk, Nicholas M., Jr., 4,052,005, Cl. 239-132.300.

Bertholet, Raymond: *See*—
Finot, Paul-Andre; Hirsbrunner, Pierre; and Bertholet, Raymond, 4,052,372, Cl. 260-112.50R.

Bessette, Richard P. Dual discharge hopper device for bulk cargo vehicles. 4,051,785, Cl. 105-280.000.

Bethlehem Steel Corporation: *See*—
Aylward, Paul T., 4,052,230, Cl. 148-2.000.
Leprohon, Louis C., Jr.; and Overdurf, John C., Jr., 4,051,661, Cl. 57-148.000.
Whiteley, Roger L.; and Boos, Roger T., 4,052,599, Cl. 364-469.000.

Biehler, Jean Marie: *See*—
Sturtz, Georges L.; Lecolier, Serge L.; Clement, Jean-Claude; and Biehler, Jean Marie, 4,052,487, Cl. 260-945.000.

Bigsby, Floyd W.: *See*—
Reed, William B.; and Bigsby, Floyd W., 4,051,856, Cl. 130-27.0HF.

Billion S.A.: *See*—
Monnet, Bernard Leon, 4,052,497, Cl. 264-255.000.

Biocel Corporation: *See*—
Penque, Ronald A., 4,052,009, Cl. 241-1.000.

Biollaz, Michel; and Kalvoda, Jaroslav, to Ciba-Geigy Corporation. 13-Ethinyl-steroids and processes for their manufacture. 4,052,421, Cl. 260-397.500.

Biot, Bernard; and Blanc, Charles, to Rhone-Poulenc-Textile. Device for introducing a yarn into a pneumatic yarn texturizing means. 4,051,581, Cl. 28-272.000.

Bioware, Inc.: *See*—
Cawley, Leo P., 4,051,752, Cl. 83-5.000.

Bird Oil Equipment, Ltd.: *See*—
Jones, Gomer W., 4,051,736, Cl. 74-41.000.

Birkeland, Stephen P.: *See*—
Huffman, William A.; Birkeland, Stephen P.; and O'Leary, Kevin P., 4,052,209, Cl. 96-1.50R.

Bishop, Richard Timothy, to Revertex (South Africa) (Proprietary) Limited. Soil treatment compositions. 4,051,630, Cl. 47-58.000.

Black, Francis B.: *See*—
Smith, Kay D.; Bachass, Arjun S.; and Black, Francis B., 4,052,702, Cl. 364-200.000.

Black, James A.; Farwell, Harry Russell; and Porth, Frank L., to Black, James A. Stencilling apparatus with flow through print and flow action. 4,051,777, Cl. 101-123.000.

Blackwell, J. Thomas; Gupton, John T.; and Nabors, Jim B., to Ciba-Geigy Corporation. Process for the production of 2-alkyl or 2-cycloalkyl-4-methyl-6-hydroxypyrimidines. 4,052,397, Cl. 260-251.00R.

Blake, Alan Ronald: *See*—
Hutt, Peter Richard; Blake, Alan Ronald; von Cavallar, Gunter; Douglas, Brian Neil; and Dodds, Philip John, 4,052,719, Cl. 340-324.0AD.

Blakelock, Harold Dennis, to Morganite Modmor Limited. Production of carbon fibre. 4,051,659, Cl. 57-140.00R.

Blanc, Charles: *See*—
Biot, Bernard; and Blanc, Charles, 4,051,581, Cl. 28-272.000.

Blanchette, Adrien Andre: *See*—
Blanchette, Lionel; and Blanchette, Adrien Andre, 4,051,923, Cl. 187-25.000.

Blanchette, Lionel; and Blanchette, Adrien Andre. Cableless cage elevator. 4,051,923, Cl. 187-25.000.

Block, Hans-Dieter: *See*—
Schliebs, Reinhard; and Block, Hans-Dieter, 4,052,484, Cl. 260-927.00R.

Blume, John H.; and Bushnell, James D., to Exxon Research and Engineering Company. Method of solvent recovery in autorefrigerant/ketone dewaxing processes. 4,052,294, Cl. 208-33.000.

Blurton, Keith F.; and Sedlak, John M., to Energetics Science, Inc. Method for the detection and measurement of nitric oxide, nitrogen dioxide and mixtures thereof. 4,052,268, Cl. 204-1.00T.

Bognar, Istvan; and Brassel, Peter, to Zellweger, Ltd. Cutting arrangement. 4,051,756, Cl. 83-389.000.

Bohl, Thomas L.; and Visdos, Leonard J., to Bailey Meter Company. Fluid sampling system. 4,051,731, Cl. 73-422.00R.

Bohm, Klaus: *See*—
Speth, Winfried; Dreiseitl, Walter; Bohm, Klaus; Schleicher, Lothar; and Polster, Herbert, 4,052,642, Cl. 318-561.000.

Bokerman, Gary N.; Colquhoun, Joseph A.; and Gordon, David J., to Dow Corning Corporation. Radiation-curable mercaptoalkyl vinyl polydiorganosiloxanes, method of coating there with and coated article. 4,052,529, Cl. 428-537.000.

Boliden Aktiebolag: *See*—
Jonsson, Erik Alfon, 4,052,014, Cl. 241-183.000.

Bom, Cornelis Johannes Gerardus: *See*—
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,051,904, Cl. 172-49.000.

Booij, Harm Marinus Wilhelm: *See*—
Druyvesteyn, Willem Frederik; and Booij, Harm Marinus Wilhelm, 4,052,707, Cl. 340-174.0TF.

Boos, Roger T.: *See*—
Whiteley, Roger L.; and Boos, Roger T., 4,052,599, Cl. 364-469.000.

Booth, James William, to Arizona Chemical Company. Process for preparing terpene polymer compositions. 4,052,549, Cl. 526-237.000.

Boothman, David R.; and Elgar, Everett C., to Canadian General Electric Company Limited. Temperature monitoring of semiconductors. 4,052,744, Cl. 361-103.000.

Boots Company Limited, The: *See*—
Adams, Stewart S.; Armitage, Bernard J.; and Nicholson, John S., 4,052,514, Cl. 424-316.000.

Borejko, Stefan, to Rollei-Werke Franke & Heidecke. Electronic flash unit with operational signal. 4,052,644, Cl. 315-151.000.

Borer, Werner J.; Kugler, Tibor; Schmidt, Walter; and Stahlin, Walter, to Prolizenz AG. Heat resistant crucible. 4,052,153, Cl. 432-156.000.

Borisov, Vasily Nikolaevich; Akulov, Evgeny Alexandrovich; and Solovei, Alexei Ivanovich. Method for separating seed cover from endosperm of grain of various cereal crops. 4,052,518, Cl. 426-482.000.

Boston University, The Trustees of: *See*—
Lichtin, Norman N.; and Wildes, Peter D., 4,052,536, Cl. 429-105.000.

Botkin, Albert L. Canning closure and method. 4,051,972, Cl. 215-260.000.

Botkin, Albert L. Canning closure and method. 4,051,973, Cl. 215-260.000.

Botvin, George B., to ACS Industries, Inc. Method of making a scouring pad or the like. 4,052,238, Cl. 156-148.000.

Bourne, Alan John; and Walton, Trevor John, to Dunlop Limited. Pneumatic tire containing gel lubricant. 4,051,884, Cl. 152-330.00L.

Bourns, Inc.: *See*—
Davis, Loren Roger, 4,052,594, Cl. 235-61.11E.

Boursaw, Thomas P. Method of making reusable writing board and the product thereof. 4,051,609, Cl. 35-66.000.

Bowden, Billy W., to T K Valve & Manufacturing, Inc. Coupling device. 4,052,091, Cl. 285-305.000.

Bowles Fluidics Corporation: *See*—
Stouffer, Ronald D.; and Bray, Harry C., Jr., 4,052,002, Cl. 239-4.000.

Bowyer, John M.: *See*—
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., 4,052,717, Cl. 340-249.000.

Boyadjieff, George I., to Varco International, Inc. Pile handling apparatus and methods. 4,051,587, Cl. 29-240.000.

Boyesen, Eyvind, to Performance Industries, Inc. Engine valving and porting. 4,051,820, Cl. 123-73.00A.

BP Chemicals Limited: *See*—
Mockett, Keith Henry George, 4,052,334, Cl. 252-429.00R.

Bradley, Edward T., to Colorkrome, Inc. Treatment of electrophotographic toner compositions. 4,052,298, Cl. 209-5.000.

Braid, Milton, to Mobil Oil Corporation. Reaction product of dialkyl alkanephosphonate, substituted imidazoline, and water in lubricant compositions. 4,052,324, Cl. 252-32.500.

Brand, Wilhelm, to Hermann Berstorff Maschinenbau GmbH. Screw extruder for thermoplastics synthetic materials or elastomers. 4,052,038, Cl. 366-90.000.

Brandenberger, Stanley G.: *See*—
McClure, James D.; and Brandenberger, Stanley G., 4,052,475, Cl. 260-672.00T.

Brandenstein, Manfred: *See*—
Garrett, Roy Peter; Parkins, Derek Ray; Brandenstein, Manfred; and Olschewski, Armin, 4,051,937, Cl. 192-88.00A.

Brandle, Karl: *See*—
Mansmann, Manfred; and Brandle, Karl, 4,052,225, Cl. 106-302.000.

Brandon, Paul W.: *See*—
Hackbarth, Lowell E.; Pyle, Sterling W.; and Brandon, Paul W., 4,052,255, Cl. 159-4.00B.

Brandt, Henry William, Jr.; and Sorlie, Donald Thomas, to Deere & Company. Structural orientation and protective apparatus for tillage assembly. 4,051,792, Cl. 111-85.000.

Brassel, Peter: *See*—
Bognar, Istvan; and Brassel, Peter, 4,051,756, Cl. 83-389.000.

Bray, Harry C., Jr.: *See*—
Stouffer, Ronald D.; and Bray, Harry C., Jr., 4,052,002, Cl. 239-4.000.

Breda, Antoine Georges Leon Jacques; and Brouard, Claude Marie Henri Emile, to Produits Chimiques Ugine Kuhlmann. Mixed chromiferous complex derived from two different aryl-azo-pyrazolone dyestuff. 4,052,376, Cl. 260-145.00B.

Breit, Paul. Apparatus utilizing deep ocean nutrients. 4,051,810, Cl. 119-3.000.

Breitenfellner, Franz; and Hrach, Josef, to Ciba-Geigy Corporation. Molding compounds based on polybutylene terephthalate. 4,052,356, Cl. 260-40.00R.

Bremer, Noel J.: *See*—
Suresh, Dev D.; Bremer, Noel J.; and Grasselli, Robert K., 4,052,418, Cl. 260-346.740.

Brendel, Hans Helmut: *See*—
Baum, Walter; and Brendel, Hans Helmut, 4,051,701, Cl. 69-33.000.

Brennan, Michael Patrick Joseph: *See*—
Robinson, Graham; Brennan, Michael Patrick Joseph; and Jones, Ivor Wynn, 4,052,535, Cl. 429-104.000.

Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. Oxopyridazinylthiomethyl derivatives of ureidocephalosporins. 4,052,554, Cl. 544-26.000.

Brewer, John A. Jet engine with compressor driven by a ram air turbine. 4,051,671, Cl. 60-262.000.

Bridger, Victor Ernest: *See*—
Martin, Barrie James; and Bridger, Victor Ernest, 4,052,004, Cl. 239-102.000.

Briles, Franklin S. Expanding head riveting method. 4,051,592, Cl. 29-509.000.

Brinkmanis, Robert Avgustovich: *See*—
Giller, Solomon Aronovich; Venter, Karl Karlovich; Trushule, Margarita Aldonovna; Berggrin, Guntis Erikovich; Brinkmanis, Robert Avgustovich; Mikstais, Uldis Yanovich; and Stankevich, Paul Alexandrovich, 4,052,419, Cl. 260-347.400.

Brinkmann, Albert: *See*—
Hegemann, Karl-Rudolf; Finger, Gunther; Brinkmann, Albert; and Weissert, Helmut, 4,052,042, Cl. 266-89.000.

Briody, Robert G., to PPG Industries, Inc. Process for preparing aqueous slurries of tabular habit diperisophthalic acid. 4,052,443, Cl. 260-502.00R.

Bristol-Myers Company: *See*—
Monkovic, Ivo; Bachand, Carol; and Wong, Henry, 4,052,389, Cl. 544-89.000.

British Petroleum Company Limited, The: *See*—
Ells, John William, 4,051,687, Cl. 61-110.000.
Ells, John William; and Parker, Ian David, 4,051,688, Cl. 61-110.000.

Brock, Michael; and Cooke, Brian Alfred, to Imperial Chemical Industries Limited. Phosphating process. 4,052,232, Cl. 148-6.15Z.

Broken Hill Associated Smelters Proprietary Limited, The: *See*—
Ward, Denby Harcourt; and Iley, James Dixon, 4,052,200, Cl. 75-78.000.

Brooks, John Langshaw; Eaton, David Crawford; and Williams, Barry, to Imperial Chemical Industries Limited. 2-Amino-4-chloro-6-(2'-hydroxy-phenoxy)-s-triazine. 4,052,392, Cl. 544-211.000.

Broome, Larkey Wilburn. Tape cassette holder for vehicular use. 4,052,113, Cl. 312-11.000.

Brother Industries, Ltd.: *See—*
Hanazono, Masami; Hishida, Yukio; Nakai, Toshio; Watanabe, Tomoyoshi; Hirayama, Takanobu; and Asakura, Hideo, 4,051,943, Cl. 197-151.000.

Brotzmann, Karl; Knuppel, Helmut; Rheinlander, Paul; and Mahn, Gustav, to Stahlwerke Peine-Salzgitter AG. Process for making steel from pig iron. 4,052,197, Cl. 75-60.000.

Brouard, Claude Marie Henri Emile: *See—*
Breda, Antoine Georges Leon Jacques; and Brouard, Claude Marie Henri Emile, 4,052,376, Cl. 260-145.00B.

Broughton, Barbara Joyce; Large, Bryan John; Marshall, Stuart Malcolm; Pain, David Lord; and Wooldridge, Kenneth Robert Harry, to May & Baker Limited. Azapurinones. 4,052,390, Cl. 544-118.000.

Brown, Harry W., to Cutler-Hammer, Inc. Pressure switch with snap-toggle adjusting means. 4,052,574, Cl. 200-83.00P.

Brown, Kenneth G. Means for outside vending. 4,051,938, Cl. 194-1.00K.

Brown, Michael Trevenen; and Rodway, William George, to Imperial Chemical Industries Limited. Finely divided, irradiated tetrafluorethylene polymers. 4,052,278, Cl. 204-159.200.

Bruce, Roger K.; and Marhold, Werner, to Sterigard Corporation. Face sealing valve applicator. 4,052,249, Cl. 156-513.000.

Brunner, Alfred, to Sulzer Brothers Limited. Water-jet electrode steam generator and electrode therefore. 4,052,586, Cl. 219-284.000.

Brunner, Josef Klemens. Separation of acids and esters in the processing of waste salt solution of cyclohexanone manufacture. 4,052,441, Cl. 560-179.000.

Brunner, Russell K.: *See—*
Johnson, James L.; and Brunner, Russell K., 4,051,735, Cl. 74-25.000.

Brunnett, Carl J., to Picker Corporation. Method and apparatus for improved radiation detection in radiation scanning systems. 4,052,620, Cl. 250-445.00T.

Brunswick Corporation: *See—*
Russell, Owen Clarkson, 4,051,802, Cl. 115-17.000.
Woodfill, William L.; and Ginnow, Edward F., 4,051,801, Cl. 115-12.00R.

Buccicone, Dario, to Bucciconi Engineering Co., Inc. Magnetic conveyor. 4,051,946, Cl. 198-477.000.

Bucciconi Engineering Co., Inc.: *See—*
Buccicone, Dario, 4,051,946, Cl. 198-477.000.

Bucheck, David J.: *See—*
Schwartz, Michael G.; Lorentzen, Alan P.; and Bucheck, David J., 4,052,306, Cl. 210-242.00S.

Buchel, Karl Heinz; Regel, Erik; and Plempel, Manfred, to Bayer Aktiengesellschaft. Disubstituted triphenylmethylimidazoles. 4,052,409, Cl. 548-341.000.

Buckeye International, Inc.: *See—*
Roberts, Leslie N., 4,051,954, Cl. 213-62.00R.

Buettner, John M., to Buettner, John M. High fidelity speaker enclosure. 4,051,919, Cl. 181-144.000.

Buffalo Weaving and Belting Co.: *See—*
Johnson, Charles E., 4,052,095, Cl. 294-74.000.

Bulthuis, Kornelis; Derksema, Bram Johan; Dijkstra, Hendrik Tjalling; and van de Wal, Johannes, to U.S. Philips Corporation. Gas-discharge laser. 4,052,681, Cl. 331-94.50D.

Bunger, Heino: *See—*
Lorenz, Hellmut; and Bunger, Heino, 4,051,655, Cl. 57-77.400.

Bunker Ramo Corporation: *See—*
Treschitta, John Phillip, 4,051,702, Cl. 70-276.000.

Burke, William Joseph: *See—*
Williams, Brown F.; Burke, William Joseph; Phillips, William; and Staebler, David Lloyd, 4,052,119, Cl. 350-3.500.

Burkhart, Merle Keith; White, Bruce Lynn; Goossen, La Vern Roy; White, Allen Andrew; and Voth, Harold William, to Hesston Corporation. Combination stack mover and processor. 4,052,011, Cl. 241-30.000.

Burlington Industries, Inc.: *See—*
Carpenter, John B., Jr., 4,051,699, Cl. 68-5.00D.

Burnishine Products Inc.: *See—*
Berliner, Julius F. T., 4,052,190, Cl. 71-11.000.

Burow, Burghard, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Guide apparatus for deflecting a linear structure. 4,052,498, Cl. 264-261.000.

Burri, Heinz; and Burri, Richard, to Rieter Machine Works, Ltd. Drive system for a spindle frame. 4,051,656, Cl. 57-105.000.

Burri, Richard: *See—*
Burri, Heinz; and Burri, Richard, 4,051,656, Cl. 57-105.000.

Burroughs Corporation: *See—*
Ragle, Herbert U., 4,052,698, Cl. 340-146.1AL.

Burroughs Wellcome Co.: *See—*
Cresswell, Ronald M.; Mentha, John W.; and Seaman, Russell L., 4,052,553, Cl. 542-469.000.

Burroway, Gary L.: *See—*
Feeney, George W.; and Burroway, Gary L., 4,052,483, Cl. 260-880.00R.

Burton, John S.; and Whitney, Ronald L., to Terminal Data Corporation. Method of moving a document for stationarily exhibiting both sides thereof. 4,052,128, Cl. 355-77.000.

Bushnell, James D.: *See—*
Blume, John H.; and Bushnell, James D., 4,052,294, Cl. 208-33.000.

Busse, Oswald; and Klesper, Hugo, to Passavant-Werke Michelbacher Hutte. Filter plate for a plate type filter press. 4,052,314, Cl. 210-230.000.

C. G. Doris: *See—*
Lamy, Jacques Edouard Jean, 4,051,686, Cl. 61-86.000.

C. van der Lely N. V.: *See—*
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,051,904, Cl. 172-49.000.

Calhoun, Bertram A.; Slonczewski, John C.; and Voegeli, Otto, to International Business Machines Corporation. Systems using lattice arrays of interactive elements. 4,052,710, Cl. 340-174.0TF.

California R & D Center: *See—*
Jones, Lawrence T.; and Sims, Anson, 4,052,082, Cl. 280-87.02R.

Caliri, Frank, to Peerless Industries Inc. Model railroad layout. 4,051,783, Cl. 104-151.000.

Calvo, Fernando, to Fabrica de Productos Quimicos y Farmaceuticos Abello, S.A. Process for synthesizing codeinone from thebaine. 4,052,402, Cl. 260-285.000.

Cameron, George L. Motor speed control circuit with overload protection. 4,052,625, Cl. 307-252.00K.

Canadian General Electric Company Limited: *See—*
Boothman, David R.; and Elgar, Everett C., 4,052,744, Cl. 361-103.000.

Canon Denshi Kabushiki Kaisha: *See—*
Nishikawa, Tatsuo, 4,051,781, Cl. 101-348.000.

Canon Kabushiki Kaisha: *See—*
Ito, Tadashi; Ito, Fumio; Nakamoto, Soichi; and Isobe, Yasuo, 4,052,727, Cl. 354-29.000.
Nishikawa, Tatsuo, 4,051,781, Cl. 101-348.000.

Cantalupi, Lewis: *See—*
Tucci, Domenick; and Cantalupi, Lewis, 4,052,718, Cl. 340-274.00R.

Caprara, Giuseppe: *See—*
Scardigno, Salvatore; Rivolta, Luigi; Caprara, Giuseppe; and Cassar, Luigi, 4,052,452, Cl. 260-535.00R.

Capurka, Zbynek Antonin; and Rumple, Ronald William, to Motorola, Inc. Selective threshold ignition circuit. 4,051,827, Cl. 123-148.00E.

Carborundum Company, The: *See—*
Mangalick, Mahesh C., 4,052,199, Cl. 75-68.00R.

Cardoza, Louis. Saw guide device. 4,051,597, Cl. 30-373.000.

Cardwell, William Richard; and Queener, Carl Alan, to International Business Machines Corporation. Sequential load dual document feed. 4,052,054, Cl. 271-227.000.

Carmo, Robert A. Combined ball and flexible track. 4,052,067, Cl. 273-109.000.

Carolinch Company, The: *See—*
Palnik, Karl, 4,052,317, Cl. 210-323.00T.

Carpenter, John B., Jr., to Burlington Industries, Inc. Liquid ammonia mercerization. 4,051,699, Cl. 68-5.00D.

Carruthers, William D.: *See—*
Walker, Bryant H.; Carruthers, William D.; and MacNitt, Donald G., Jr., 4,051,585, Cl. 29-156.80R.

Carter, Cecil O.: *See—*
Hutson, Thomas, Jr.; and Carter, Cecil O., 4,052,469, Cl. 260-653.600.

Carter, Ronald A.: *See—*
Andrus, Paul W.; and Carter, Ronald A., 4,051,705, Cl. 72-60.000.

Carter, Sidney T., to A-T-O Inc. Rotary vacuum picker with mechanical assist. 4,052,050, Cl. 271-18.300.

Casavant, Roger M., to Product Explorations Incorporated. Combination racket press and cover. 4,052,062, Cl. 273-74.000.

Case, John Reginald; and Moore, Geoffrey James, to Imperial Chemical Industries Limited. Manufacture of 1,1'-dialkyl-4,4'-bipyridylium salts. 4,052,405, Cl. 260-294.80R.

Casey, Donald J.: *See—*
Kreahling, Robert P.; Casey, Donald J.; and Goldenberg, David Z., 4,052,500, Cl. 264-290.00T.
Kreahling, Robert P.; Casey, Donald J.; and Goldenberg, David Z., 4,052,501, Cl. 264-290.00T.

Cassar, Luigi: *See—*
Scardigno, Salvatore; Rivolta, Luigi; Caprara, Giuseppe; and Cassar, Luigi, 4,052,452, Cl. 260-535.00R.

Castle, Trevor William. Electronic amusement machine. 4,052,057, Cl. 273-1.00E.

Castoldi, Alex J., Jr., to International Recreational Industries, Inc. Popcorn package for two users. 4,051,993, Cl. 229-22.000.

Caterpillar Tractor Company: *See—*
Reinsma, Harold L., 4,051,920, Cl. 184-1.00R.

Cathcart, Thomas E., Jr.: *See—*
Lytle, William F.; and Cathcart, Thomas E., Jr., 4,052,713, Cl. 346-140.00A.

Cawley, Leo P., to Bioware, Inc. Process for gel cutting. 4,051,752, Cl. 83-5.000.

Ceca S.A.: *See—*
Kragen, Horst, 4,052,264, Cl. 195-100.000.

Celanese Corporation: *See—*
Berardinelli, Frank M.; and Edelman, Robert, 4,052,360, Cl. 260-40.00R.
Hughes, Oscar Richard, 4,052,401, Cl. 260-340.700.
Slinkard, William Earl; and Baylis, Anthony Basil, 4,052,417, Cl. 260-346.750.
Vanderspurt, Thomas H., 4,052,424, Cl. 260-410.000.

Central Welding Supply Co., Inc.: *See—*
Sanders, Harold D.; and Landreth, Thomas C., 4,052,116, Cl. 339-8.00R.

Cerberus AG: *See—*
Keller, Hansjurg, 4,052,616, Cl. 250-353.000.

CF&I Engineers, Inc.: *See—*
Vertenstein, Mathieu J., 4,052,304, Cl. 210-78.000.

Chalmers, Edward L., to Garcia Corporation, The. Boot buckle. 4,051,611, Cl. 36-50.000.

Chanaud, Robert Charles: *See*—
McGregor, Howard Norman; and Chanaud, Robert Charles, 4,052,720, Cl. 340-420.000.
Chang, Clarence D.; Lang, William H.; and Silvestri, Anthony J., to Mobil Oil Corporation. Conversion of methanol to olefinic components. 4,052,479, Cl. 260-682.000.
Chang, I-Cheng, to Itek Corporation. Noncollinear tunable acousto-optic filter. 4,052,121, Cl. 350-149.000.
Chang, Leei; and Verburg, John A., to American Optical Corporation. Process for coating a synthetic polymer sheet material with a durable abrasion-resistant vitreous composition. 4,052,520, Cl. 427-164.000.
Chappelear, Robert N.: *See*—
Hand, Ronnie D.; Chappelear, Robert N.; and Mueller, Dale R., 4,052,015, Cl. 242-18.00G.
Charles F. Kettering Foundation: *See*—
Raveed, Dan, 4,051,755, Cl. 83-167.000.
Charles Stark Draper Laboratory, Inc., The: *See*—
Kramer, Manuel; and Dapprich, Douglas J., 4,052,654, Cl. 318-649.000.
Charon, Clarence W.: *See*—
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Chaudhari, Praveen; and Woolhouse, Geoffrey Richard, to International Business Machines Corporation. Accessing information in a lattice array by dislocation punching. 4,052,709, Cl. 340-174.0TF.
Chemetron Corporation: *See*—
Rogers, Gerald Lee, 4,052,008, Cl. 239-526.000.
Chen, Henry T. Method and apparatus for making fiber reinforced tape. 4,052,239, Cl. 156-177.000.
Cherrington, Martin D., to Tidril Corporation. Apparatus and process for drilling underground arcuate paths utilizing directional drill and following liner. 4,051,911, Cl. 175-107.000.
Chevron Research Company: *See*—
Fredriksson, Oke A., 4,052,694, Cl. 340-17.00R.
Chicago Bridge & Iron Company: *See*—
Stafford, Donald Claude, 4,052,090, Cl. 285-61.000.
Chihara, Hiroyuki; and Numabe, Hitomi, to Kabushiki Kaisha Suwa Seikosha. Electronic timepiece. 4,051,663, Cl. 58-26.00R.
Chikamori, Kunio, to Agency of Industrial Science & Technology. Electrochemical wire cutting method. 4,052,274, Cl. 204-129.430.
Child, Edward T.; Schlinger, Warren G.; and Richter, George N., to Texaco Inc. Production of purified synthesis gas H_2-rich gas, and by-product CO_2-rich gas. 4,052,176, Cl. 55-32.000.
Chion, Pierre; and Cuidard, Robert, to Rhone-Poulenc-Textile. Poly(-vinylidene fluoride) yarns and fibers. 4,052,550, Cl. 526-255.000.
Chiu, Ran-Fun; Sherman, James Bryon; and Gilbert, Judson Truman, to Milgo Electronic Corporation. Phase-jump detector and corrector method and apparatus for phase-modulated communication systems that also provides a signal quality indication. 4,052,557, Cl. 178-67.000.
Chiulli, Robert D., to Medico Developments, Inc. Telescoping neurosurgical scalp retractor. 4,051,844, Cl. 128-20.000.
Chlod, Martinus P.: *See*—
Tiggelers, Hubertus H.; and Chlod, Martinus P., 4,051,986, Cl. 226-114.000.
Chloride Group Limited: *See*—
Foulkes, Stanley Charles, 4,051,876, Cl. 141-1.100.
Chloride Silent Power Limited: *See*—
Robinson, Graham; Brennan, Michael Patrick Joseph; and Jones, Ivor Wynn, 4,052,535, Cl. 429-104.000.
Cho, Boong Youn, to Industrial Nucleonics Corporation. Spherical cavity method and apparatus for measuring a sheet material property using infrared radiation. 4,052,615, Cl. 250-341.000.
Christensen, Paul: *See*—
Garrett, Roger E.; and Christensen, Paul, 4,052,617, Cl. 250-360.000.
Christidis, Yani; Mauz, Otto; and Prinz, Eberhard, to Nobel Hoechst Chimie; and Hoechst Aktiengesellschaft. Bis(hydroxy-di-tert.butyl-phenyl)-alkanoic acid esters. 4,052,364, Cl. 260-45.85B.
Christner, George M.: *See*—
Clark, Frank M.; and Christner, George M., 4,052,025, Cl. 244-25.000.
Christy, Marcia E.: *See*—
Anderson, Paul S.; Christy, Marcia E.; and Ponticello, Gerald S., 4,052,508, Cl. 424-258.000.
Chromy, Franz; Winkler, Walter; Mahr, Manfred; and Mark, Fritz, to Hilti Aktiengesellschaft. Device for securing an expansion anchor. 4,051,990, Cl. 227-10.000.
Chrysler Corporation: *See*—
Hurst, John W., 4,051,934, Cl. 192-21.000.
Ciba-Geigy AG: *See*—
Cook, Robert Stanley; and Wright, Peter John, 4,052,528, Cl. 428-483.000.
Ciba-Geigy Corporation: *See*—
Biollaz, Michel; and Kalvoda, Jaroslav, 4,052,421, Cl. 260-397.500.
Blackwell, J. Thomas; Gupton, John T.; and Nabors, Jim B., 4,052,397, Cl. 260-251.00R.
Breitenfellner, Franz; and Hrach, Josef, 4,052,356, Cl. 260-40.00R.
Cook, Barry; Dingwall, John Grey; and Thomas, Brian Martin, 4,052,160, Cl. 21-2.70A.
Habermeier, Jurgen; Batzer, Hans; and Porret, Daniel, 4,052,366, Cl. 260-63.00R.
Heusler, Karl; and Woodward, Robert Burns, 4,052,408, Cl. 260-306.70C.
Huber-Emden, Helmut, 4,052,485, Cl. 260-928.000.
Mattern, Gunter, 4,052,406, Cl. 260-294.80R.
Pociask, Joseph R., 4,052,396, Cl. 260-251.00R.
von der Crone, Jost; Pugin, Andre; and Mory, Rudolf, 4,052,410, Cl. 548-305.000.
Wehner, Wolfgang; Maul, Rudolf; and Jung, Hans-Wolf, 4,052,426, Cl. 260-429.700.
Cimarusti, Christopher M., to E. R. Squibb & Sons, Inc. 4,5-Secopregnane derivatives. 4,052,422, Cl. 260-408.000.
Cincinnati Incorporated: *See*—
Halter, Richard F.; and DeWeese, Richard L., 4,051,590, Cl. 29-420.500.
Cincinnati Milacron, Inc.: *See*—
Fisher, Robert Clifford, 4,051,634, Cl. 51-103.00R.
Gruber, Paul, 4,051,830, Cl. 125-11.00R.
Claiborne, Jefferson Lyle, to Dixie Yarns, Inc. Flame-retardant yarn or thread containing brominated ester of oleic or linoleic acid. 4,052,321, Cl. 252-8.600.
Clark, Frank M.; and Christner, George M. Semi-buoyant aircraft. 4,052,025, Cl. 244-25.000.
Clark, Wallace. Two way earth boring fluid motor. 4,051,910, Cl. 175-103.000.
Clark, William Eugene, to Federal-Mogul Corporation. Method for manufacturing bidirectional hydrodynamic polytetrafluoroethylene seals. 4,052,502, Cl. 264-293.000.
Clarke, John Robin Paul, to Imperial Chemical Industries Limited. Monitoring device. 4,052,162, Cl. 23-253.00R.
Clarke, Joseph A., Jr. Cushioned liner for a bath tub. 4,051,563, Cl. 4-173.00R.
Clary, Roger, to Howard Machinery Limited. Fruit harvesting machine. 4,051,649, Cl. 56-330.000.
Clauss, Karl: *See*—
Pietsch, Hartmut; Clauss, Karl; Jensen, Harald; and Schmidt, Erwin, 4,052,453, Cl. 260-543.00F.
Clayton Manufacturing Company: *See*—
Jennings, William S., 4,051,814, Cl. 122-448.00R.
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Sturtz, Georges L.; Lecolier, Serge L.; Clement, Jean-Claude; and Biehler, Jean Marie, 4,052,487, Cl. 260-945.000.
Coal Industry (Patents) Limited: *See*—
Highley, John, 4,052,140, Cl. 431-7.000.
Parfitt, Norman Leslie Cyril, 4,051,929, Cl. 188-196.00C.
Coberley, Lavan E. Fluid injection apparatus for internal combustion engine. 4,051,815, Cl. 123-25.00A.
Cocking, Glyn; and Jones, John Owen, to Saunders Valve Company Limited. Fluid flow control valves. 4,051,865, Cl. 137-556.000.
Cole, Edward L.; Hess, Howard V.; and Franz, William F., to Texaco Inc. Treatment of solid fuels. 4,052,169, Cl. 44-1.00R.
Coleman, Charles Hubert, Jr., to Ampex Corporation. Moire interference reducing circuit for FM video recorders. 4,052,740, Cl. 360-30.000.
Colgate-Palmolive Company: *See*—
Egan, Francis L., Jr., 4,051,853, Cl. 128-287.000.
Collin, Lars Thorbjorn, to Lars Collin Consult AB. Marine propulsion plant with reversible propeller shaft connected thereto. 4,051,679, Cl. 60-656.000.
Colling, Joseph; Heintz, Carlo; and Unbekand, Alfred, to ARBED - Acieries Reunies de Burbach-Eich-Dudelange. Method of and apparatus for the decrusting of metallurgical lances. 4,052,044, Cl. 266-225.000.
Collins, Jerry Alan, Sr.; and Spaw, Robert Lynn, to Automatic Terminal Information Systems, Inc. Intelligent multiplex system for subsurface wells. 4,052,703, Cl. 364-200.000.
Collins, Robert F., to Kendall Company, The. Drape assembly with pouch and method. 4,051,845, Cl. 128-132.00D.
Collins, Ronald Eugene. Martial arts boot. 4,051,613, Cl. 36-114.000.
Colorkrome, Inc.: *See*—
Bradley, Edward T., 4,052,298, Cl. 209-5.000.
Colquhoun, Joseph A.: *See*—
Bokerman, Gary N.; Colquhoun, Joseph A.; and Gordon, David J., 4,052,529, Cl. 428-537.000.
Uhlmann, John G.; and Colquhoun, Joseph A., 4,052,495, Cl. 264-216.000.
Com Tel, Inc.: *See*—
Robertson, Bruce W.; and Hales, Pryce Neilson, 4,052,737, Cl. 358-86.000.
Comau Industriale S.p.A.: *See*—
Corni, Vittorio, 4,052,601, Cl. 364-104.000.
Comer, William T.: *See*—
Matier, William L.; and Comer, William T., 4,052,455, Cl. 260-562.00R.
Communication Equipment & Contracting Co., Inc.: *See*—
Pirnie, Robert M., III, 4,052,569, Cl. 179-27.0FH.
Communications Satellite Corporation: *See*—
Jankowski, Joseph Albin, 4,052,568, Cl. 179-15.0AS.
Compagnie Francaise de Raffinage: *See*—
Tannenberger, Helmut; and van den Berghe, Paul, 4,052,532, Cl. 429-33.000.
Compagnie Nationale Air France: *See*—
Steinthal, Pierre T., 4,052,103, Cl. 297-417.000.
Compur-Electronic Gesellschaft mit beschrankter Haftung: *See*—
Konig, Wolfgang, 4,052,164, Cl. 23-259.000.
Wienchol, Otto; and Muhlbock, Franz, 4,052,165, Cl. 23-259.000.
Condo, Antonino: *See*—
Papa, Sisto Sergio; and Condo, Antonino, 4,052,375, Cl. 260-145.00C.

Congin, James V.: *See—*
Meditz, William F.; and Congin, James V., 4,051,790, Cl. 109-58.000.
Conkle, Neil E. Machine for disassembling wood pallets. 4,051,588, Cl. 29-252.000.
Conservocon, Inc.: *See—*
Kenny, Shaun S.; and Armstrong, Leonard J., 4,052,035, Cl. 251-14.000.
Container Corporation of America: *See—*
Karpinsky, William J., 4,052,154, Cl. 432-222.000.
Continental Oil Company: *See—*
Every, Richard L., 4,052,503, Cl. 423-470.000.
Cook, Barry; Dingwall, John Grey; and Thomas, Brian Martin, to Ciba-Geigy Corporation. Corrosion inhibitors. 4,052,160, Cl. 21-2.70A.
Cook, Robert Stanley; and Wright, Peter John, to Ciba-Geigy AG. Tetrapolymer subbed photographic film. 4,052,528, Cl. 428-483.000.
Cooke, Brian Alfred: *See—*
Brock, Michael; and Cooke, Brian Alfred, 4,052,232, Cl. 148-6.15Z.
Coon, William G., Jr. Combined hay carrier and feeder. 4,051,963, Cl. 214-144.000.
Cooper, Allen K.: *See—*
Honikman, Terence C., 4,052,000, Cl. 237-1.00A.
Cooper, John F.: *See—*
Frankel, Donald P.; Kendall, Willard E.; and Cooper, John F., 4,051,561, Cl. 4-131.000.
Cordero, Jose, Jr. Structural steelworker's safety clamp. 4,052,028, Cl. 248-228.000.
Corey, Harold: *See—*
Knapp, Philip B.; and Corey, Harold, 4,051,628, Cl. 47-48.500.
Corni, Vittorio, to Comau Industriale S.p.A. Control systems for machines and plants generally, particularly described for applications on machine tools. 4,052,601, Cl. 364-104.000.
Corning Glass Works: *See—*
Anderson, Joseph W., 4,052,184, Cl. 65-102.000.
Aronson, Bernard S.; and Murphy, James A., 4,052,273, Cl. 204-37.00R.
Baker, Frederick G.; and Eaton, David L., 4,052,010, Cl. 241-20.000.
Dockerty, Stuart M., deceased; and Dockerty, Robert C., executor, 4,052,189, Cl. 65-319.000.
Dominick, Ellen K.; and Wexell, Dale R., 4,052,641, Cl. 313-450.000.
Hertl, William; and Odstrchel, Gerald, 4,052,504, Cl. 424-1.000.
Cory Food Services, Inc.: *See—*
Petry, Stanton H., 4,051,839, Cl. 126-344.000.
Costin, Darryl J., to Owens-Corning Fiberglas Corporation. Refractories and methods of making same. 4,052,339, Cl. 252-512.000.
Cotton, Larry G., to Iowa Mold Tooling Co., Inc. Tire manipulating apparatus. 4,051,966, Cl. 214-332.000.
Cousins, Otto J.: *See—*
Sekera, George F., Jr.; and Cousins, Otto J., 4,052,591, Cl. 219-506.000.
Crane Co.: *See—*
Holt, James W.; and Meeks, John K., 4,051,869, Cl. 137-636.100.
Crane, Grant; and Kay, Edward Leo, to Firestone Tire & Rubber Company, The. Method of reclaiming scrap vulcanized rubber and the soluble reclaimed rubber thus produced. 4,052,344, Cl. 260-2.300.
Credner, Hans Heinrich; Lassig, Wolfgang; Meier, Ernst; Ranz, Erwin; Schleger, Siegfried; and Schranz, Karl-Wilhelm, to AGFA-Gevaert, A.G. Light-sensitive photographic material. 4,052,213, Cl. 96-66.300.
Cresswell, Ronald M.; Mentha, John W.; and Seaman, Russell L., to Burroughs Wellcome Co. 5-Benzyl pyrimidines intermediates therefore, and method. 4,052,553, Cl. 542-469.000.
Crisenbery, Richard T.; and Tinholt, Thomas H., to Eaton Corporation. Fluid coupling device and valve support used therein. 4,051,936, Cl. 192-58.00B.
Crittenden, Bernard R., to Woodward Governor Company. Digital-analog frequency error signaling. 4,052,676, Cl. 328-134.000.
Crookshank, Fred T., to Texaco Inc. Corrosion-inhibited grease compositions. 4,052,322, Cl. 252-18.000.
CRYO-MAID Inc.: *See—*
Mercer, James L.; and Togashi, Hachiro J., 4,052,293, Cl. 208-11.00R.
Cuidard, Robert: *See—*
Chion, Pierre; and Cuidard, Robert, 4,052,550, Cl. 526-255.000.
Cullen, Robert E.: *See—*
Herzer, William P.; and Cullen, Robert E., 4,051,794, Cl. 112-121.120.
Cunningham, Cecil R.; and Symborski, Alex P., to Owens-Corning Fiberglas Corporation. Method and apparatus for removing wound packages from a winding machine. 4,052,016, Cl. 242-18.00G.
Cunningham, Francis V., to Joslyn Mfg. and Supply Co. Spark gap for achieving arc elongation and compression without the use of supplementary magnetic means. 4,052,639, Cl. 313-325.000.
Cunningham, Virginia L., to Rohm and Haas Company. Crosslinked, macroreticular poly(dimethylaminoethyl methacrylate) ion-exchange resins and method of preparation by aqueous suspension polymerization using trialkylamine phase extender. 4,052,343, Cl. 260-2.10E.
Curtillat, Pierre, to Rhone-Poulenc-Textile. Method and apparatus for stuffing yarns. 4,051,580, Cl. 28-255.000.
Cushman, David W.; and Ondetti, Miguel Angel, to E. R. Squibb & Sons, Inc. Carboxyacylproline derivatives. 4,052,511, Cl. 424-274.000.
Cushman, Donald R.; Pagen, Charles A.; Schick, John W.; and Yan, Tsoung-Yuan, to Mobil Oil Corporation. Asphalt compositions. 4,052,290, Cl. 208-6.000.
Cutler-Hammer, Inc.: *See—*
Brown, Harry W., 4,052,574, Cl. 200-83.00P.
D.D.I. Communications, Inc.: *See—*
MacKay, William Allan, 4,052,566, Cl. 179-15.00A.
MacKay, William Allan, 4,052,567, Cl. 179-15.0AL.
Dahl, Helmut; and Lorenz, Hans Peter, to Schering Aktiengesellschaft. Process for the preparation of bicycloalkane derivatives. 4,052,447, Cl. 260-514.00G.
Dai Nippon Printing Company, Ltd.: *See—*
Wada, Masanobu; Koike, Yujiro; and Okuma, Yoshihisa, 4,052,739, Cl. 358-299.000.
Daicel Ltd.: *See—*
Sakakibara, Kouzou; Abe, Iwao; Yokoyama, Takushi; and Matuokadeclare, Kazuyuki, 4,052,462, Cl. 260-604.00R.
Daifotes, Theodore Steven. Emergency blinker and flag display. 4,052,697, Cl. 340-87.000.
Daikin Kogyo Co., Ltd.: *See—*
Yamada, Tatsunori; Mori, Shigeru; Kato, Kaoru; Arai, Yasuyuki; and Sakitani, Katumi, 4,051,888, Cl. 165-1.000.
D'Alelio, Gaetano F. Halogenated esters of phosphorus-containing acids (III). 4,052,416, Cl. 260-348.420.
Daly, C. Robert. Golf club. 4,052,075, Cl. 273-171.000.
Daly, Noel, to E. D. Bullard Company. Protective headwear. 4,051,555, Cl. 2-412.000.
D'Amore, Michael Brian; and Sleight, Arthur William, to Du Pont de Nemours, E. I., and Company. Catalyst regeneration with impregnation of bismuth and molybdenum. 4,052,332, Cl. 252-413.000.
Damron, Wilbur T. Safety toe shield. 4,051,612, Cl. 36-72.00R.
Danfoss A/S: *See—*
Andersen, Hans Skov, 4,051,868, Cl. 137-596.130.
Gramkow, Asger, 4,052,650, Cl. 318-221.00H.
D'Angelo, Antonio Joseph: *See—*
McKellin, Wilbur H.; Mageli, Orville L.; and D'Angelo, Antonio Joseph, 4,052,543, Cl. 526-48.000.
Dannels, Bobby F.; and Geering, Emil J., to Hooker Chemicals & Plastics Corporation. Method for production of sulfhydryl compounds. 4,052,281, Cl. 204-159.220.
Dannels, Bobby F., to Hooker Chemicals & Plastics Corporation. Sensitized production of sulfhydryl compounds using ultraviolet radiation. 4,052,283, Cl. 204-159.230.
Dapprich, Douglas J.: *See—*
Kramer, Manuel; and Dapprich, Douglas J., 4,052,654, Cl. 318-649.000.
Darr, Russell C.: *See—*
Sarem, Amir M.; Darr, Russell C.; Elchlepp, Dale L.; and Spratt, Robert B., 4,051,901, Cl. 166-270.000.
Daubert, Richard Francis, Jr.: *See—*
Lindsay, Ernest Harold, Jr.; and Daubert, Richard Francis, Jr., 4,052,315, Cl. 210-232.000.
d'Auria, Luigi: *See—*
Spitz, Erich; d'Auria, Luigi; and Huignard, Jean-Pierre, 4,052,706, Cl. 340-173.0LM.
Davenport, Stanley; and Villari, Frank K., to Kendall Company, The. Chin strap for protective headgear. 4,051,556, Cl. 2-421.000.
Davies, William Martin: *See—*
Pennell, Anthony Robin; Dover, Peter Leslie; and Davies, William Martin, 4,052,148, Cl. 432-1.000.
Davila, Jose E.: *See—*
Mojden, Wallace W.; Davila, Jose E.; Hooper, George W.; Kwiatkowski, Gerald M.; and Pantel, Howard W., Jr., 4,051,965, Cl. 214-16.40A.
Davis, Lance A.: *See—*
Polk, Donald E.; Ray, Ranjan; and Davis, Lance A., 4,052,201, Cl. 75-124.000.
Davis, Loren Roger, to Bourns, Inc. Mark reader with improved mark sensing heads. 4,052,594, Cl. 235-61.11E.
Dawkins, Claude W. Air conditioning apparatus. 4,051,691, Cl. 62-236.000.
deBarbdillo, John Joseph, II: *See—*
Larson, Floyd Gotthard, Jr.; and deBarbdillo, John Joseph, II, 4,052,203, Cl. 75-130.00B.
Decatur Electronics, Inc.: *See—*
Millard, Keith, 4,052,722, Cl. 343-8.000.
Decca Limited: *See—*
Griffiths, Frank Anthony, 4,052,736, Cl. 358-37.000.
Deere & Company: *See—*
Behrens, Robert Nick, 4,051,915, Cl. 180-82.00A.
Brandt, Henry William, Jr.; and Sorlie, Donald Thomas, 4,051,792, Cl. 111-85.000.
Deguchi, Hidetaka; Wada, Hajime; Endo, Takaya; Kikuchi, Shoji; and Hori, Haruo, to Konishiroku Photo Industry Co., Ltd. Photographic silver halide emulsion containing 2-equivalent cyan coupler. 4,052,212, Cl. 96-56.200.
De Kok, Johannis, to U.S. Philips Corporation. High-pressure gas discharge lamp and electron emissive electrode structure therefor. 4,052,634, Cl. 313-184.000.
Delo, William A.; and Nielsen, Raymond J., to 4 - Share, Inc. Parts washer. 4,052,227, Cl. 134-56.00R.
DeLoach, Guessman L.; and Foster, Phillip H. Automatic animal feeding apparatus. 4,051,812, Cl. 119-51.110.
DeLong, David C. Stadium riser individual seat, support and armrest with common seat-row backrest. 4,052,101, Cl. 297-243.000.
Demers, Jean Guy: *See—*
Nikitits, Edwin; and Demers, Jean Guy, 4,052,100, Cl. 297-159.000.

DeNigris, Ernest Gerard; and Tutko, Albert John, to Bell Telephone Laboratories, Incorporated; and Western Electric Company, Inc. Fuse clip assembly. 4,052,688, Cl. 337-213.000.

Denton, Roy V.: *See—*
Mills, King L.; and Denton, Roy V., 4,052,467, Cl. 260-638.00B.

Derenbecher, William Joseph, Jr., to RCA Corporation. PAL four-frame subcarrier phase detector. 4,052,733, Cl. 358-10.000.

Derksema, Bram Johan: *See—*
Bulthuis, Kornelis; Derksema, Bram Johan; Dijkstra, Hendrik Tjalling; and van de Wal, Johannes, 4,052,681, Cl. 331-94.50D.

De Ronde, Frans Christiaan: *See—*
van Heuven, Johannes Hendrik Cornelis; and De Ronde, Frans Christiaan, 4,052,683, Cl. 333-21.00R.

de Ruggieri, Pietro; and Sighinolfi, Orazio, to Farmilla Farmaceutici Milano S.p.A. Tetrahydropyranyl ethers of estrogens. 4,052,352, Cl. 260-239.55R.

DeSoto, Inc.: *See—*
Sekmakas, Kazys, 4,052,480, Cl. 260-856.000.

Detonnancourt, Maurice J., to Owens-Corning Fiberglas Corporation. Weft yarn carrier. 4,051,873, Cl. 139-440.000.

Detroit Gasket and Manufacturing Company: *See—*
Walter, William J., 4,052,241, Cl. 156-245.000.

Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler: *See—*
Schreyer, Gerd; Geiger, Friedhelm; and Hensel, Jorg, 4,052,445, Cl. 260-513.00R.

Deutsche Texaco Aktiengesellschaft: *See—*
Michalczyk, Georg; and Gluzek, Karl-Heinz, 4,052,335, Cl. 252-446.000.

Devitt, John L., to General Battery Corporation. Battery vent plug. 4,052,534, Cl. 429-86.000.

DeWeese, Richard L.: *See—*
Halter, Richard F.; and DeWeese, Richard L., 4,051,590, Cl. 29-420.500.

Diamond International Corporation: *See—*
Anderson, Walter F., 4,051,983, Cl. 222-321.000.

Diamond Power Specialty Corporation: *See—*
Weaver, Norman Dean, 4,052,089, Cl. 285-47.000.

Diamond Shamrock Corporation: *See—*
Gunn, Walter H., 4,052,231, Cl. 148-6.200.

Diamond Shamrock Technologies, S.A.: *See—*
Beer, Henri Bernard, 4,052,271, Cl. 204-38.00A.

Dian, Walter, to Beatrice Foods Co. Single point resilient and adjustable mount for derailler. 4,051,738, Cl. 74-217.00B.

Diana, Guy D., to Sterling Drug Inc. 1-Phenyl-3-azacarbocyclic-ureas. 4,052,382, Cl. 260-239.0BE.

Diassi, Patrick A.: *See—*
Stiller, Eric T.; Levine, Seymour D.; Principe, Pacifico A.; and Diassi, Patrick A., 4,052,436, Cl. 560-52.000.

Dibelius, Gunter: *See—*
Forster, Siegfried; Dibelius, Gunter; Hewing, Gunter; and Singh, Jasbir, 4,052,260, Cl. 176-60.000.

Dickey-john Corporation: *See—*
Steffen, Ronald W., 4,052,003, Cl. 239-71.000.

Dickore, Karlfried; Engels, Hans Dieter; Kratzer, Hans; and Merz, Walter, to Bayer Aktiengesellschaft. Production of 3,3-dimethyl-2-oxo-butyric acid salt. 4,052,460, Cl. 260-593.00H.

Dickson, Thomas David, Jr., to Alza Corporation. Apparatus and method for winding elastomeric fiber. 4,052,019, Cl. 242-47.000.

Dieterich, Dieter; and Markusch, Peter, to Bayer Aktiengesellschaft. Inorganic-organic compositions. 4,052,347, Cl. 260-2.5AK.

Diggs, Richard E. High capacity loader blade. 4,051,614, Cl. 37-117.500.

Dijkstra, Hendrik Tjalling: *See—*
Bulthuis, Kornelis; Derksema, Bram Johan; Dijkstra, Hendrik Tjalling; and van de Wal, Johannes, 4,052,681, Cl. 331-94.50D.

Dingwall, John Grey: *See—*
Cook, Barry; Dingwall, John Grey; and Thomas, Brian Martin, 4,052,160, Cl. 21-2.70A.

Dion, C. Norman: *See—*
Barber, John A.; Dion, C. Norman; and James, Richard N., 4,052,750, Cl. 360-135.000.

Disogrin Industries, Inc.: *See—*
Faber, Klaus, 4,052,112, Cl. 308-3.500.

Dits, Herbert: *See—*
Harcuba, Siegfried; and Dits, Herbert, 4,051,754, Cl. 83-124.000.

Dix, James S.; and Mathis, Ronald D., to Phillips Petroleum Company. Stabilization of olefin polymers. 4,052,351, Cl. 260-23.00H.

Dixie Yarns, Inc.: *See—*
Claiborne, Jefferson Lyle, 4,052,321, Cl. 252-8.600.

Dixson, Inc.: *See—*
Lowery, Dennis J.; Merchant, Robert E.; and Walls, Milton A., 4,052,099, Cl. 296-91.000.

Dobson, John Vincent, to National Research Development Corporation. Ion selective electrodes. 4,052,285, Cl. 204-195.00G.

Dockerty, Robert C., executor: *See—*
Dockerty, Stuart M., deceased; and Dockerty, Robert C., executor, 4,052,189, Cl. 65-319.000.

Dockerty, Stuart M., deceased; and by Dockerty, Robert C., executor, to Corning Glass Works. Apparatus for inhibiting checks and cracks in the moil or yoke area of TV funnels. 4,052,189, Cl. 65-319.000.

Dockner, Toni; Wallis, Albrecht; Fikentscher, Rolf; Thomas, Rainer; and Herzog, Reinhard, to BASF Aktiengesellschaft. Manufacture of aziridinocarboxylic acid esters. 4,052,384, Cl. 260-239.00E.

Dr. Ernst Fehrer Gesellschaft m.b.H. & Co., K.G. Textilmaschinenfabrik u. Stahlbau: *See—*
Mitteregger, Anton, 4,051,653, Cl. 57-58.890.

Dr. Johannes Heidenhain, GmbH: *See—*
Spies, Alfons, 4,051,657, Cl. 57-124.000.

Dodds, Philip John: *See—*
Hutt, Peter Richard; Blake, Alan Ronald; von Cavallar, Gunter; Douglas, Brian Neil; and Dodds, Philip John, 4,052,719, Cl. 340-324.0AD.

Dokoupil, Jiri, to Maschinenfabrik Turner GmbH. Processing of leather. 4,051,700, Cl. 69-33.000.

Dominick, Ellen K.; and Wexell, Dale R., to Corning Glass Works. Electrically conductive coating in cathode ray tube. 4,052,641, Cl. 313-450.000.

Donegan, Edward Alfred, to TRW Canada Limited. Extension rods used in percussive drilling. 4,051,906, Cl. 173-131.000.

Donk, Daniel Lawrence; and Olson, Robert Hutchins, to Mobil Oil Corporation. Bag closure. 4,051,994, Cl. 229-65.000.

Donofrio, James W.: *See—*
Garcia, Steve, 4,051,997, Cl. 232-35.000.

Dore, James E.: *See—*
Yarwood, John C.; Dore, James E.; and Preuss, Robert K., 4,052,198, Cl. 75-68.00R.

Dorph, Thor, to Lie, Bjorn; and Lie, Gina, part interest to each. Automatic line release for spin fishing equipment. 4,051,617, Cl. 43-18.00R.

Douglas, Brian Neil: *See—*
Hutt, Peter Richard; Blake, Alan Ronald; von Cavallar, Gunter; Douglas, Brian Neil; and Dodds, Philip John, 4,052,719, Cl. 340-324.0AD.

Douglas, Lawrence M., to Polaroid Corporation. Camera with movable film drive and optical unit. 4,052,729, Cl. 354-86.000.

Douma, William L.: *See—*
Whelan, Edward J.; and Douma, William L., 4,052,152, Cl. 432-122.000.

Doust, David John. Method and apparatus for freezing fish. 4,051,690, Cl. 62-64.000.

Dover, Peter Leslie: *See—*
Pennell, Anthony Robin; Dover, Peter Leslie; and Davies, William Martin, 4,052,148, Cl. 432-1.000.

Dow Chemical Company, The: *See—*
Goralski, Christian T.; Klingler, Thomas C.; and Wolf, Paul A., 4,052,258, Cl. 162-161.000.
Mixan, Craig E.; and Pews, R. Garth, 4,052,394, Cl. 260-250.0BC.
Peet, Norton P.; and Sunder, Shyam, 4,052,385, Cl. 260-239.0BF.
Priddy, Duane B., 4,052,464, Cl. 260-610.00C.

Dow Corning Corporation: *See—*
Bokerman, Gary N.; Colquhoun, Joseph A.; and Gordon, David J., 4,052,529, Cl. 428-537.000.
Marinik, James A., 4,052,357, Cl. 260-37.0SB.
Uhlmann, John G.; and Colquhoun, Joseph A., 4,052,495, Cl. 264-216.000.

Dowd, Allyn C.; and Rahman, Habibur, to Massey-Ferguson Inc. Valve control mechanism. 4,051,860, Cl. 137-271.000.

Dragan, Carl F.: *See—*
Freeman, David Bruce; Patton, Michael C.; and Dragan, Carl F., 4,051,569, Cl. 12-146.0CK.

Dreiseitl, Walter: *See—*
Speth, Winfried; Dreiseitl, Walter; Bohm, Klaus; Schleicher, Lothar; and Polster, Herbert, 4,052,642, Cl. 318-561.000.

Driver, W. B. Downhole drilling system. 4,051,908, Cl. 175-78.000.

Druyvesteyn, Willem Frederik; and Booij, Harm Marinus Wilhelm, to U.S. Philips Corporation. Magnetic device having domains of two different sizes in a single layer. 4,052,707, Cl. 340-174.0TF.

Duchess Mfg. Corporation: *See—*
Learn, Richard D., 4,051,668, Cl. 59-80.000.

Dudheker, Jay; and Isaacson, Charles E., to Lear Siegler, Inc. Atmospheric burner for heating furnaces. 4,052,141, Cl. 431-167.000.

Duembgen, Gerd: *See—*
Krabetz, Richard; Engelbach, Heinz; Lebert, Ulrich; Frey, Walter; Duembgen, Gerd; Thiessen, Fritz; and Willersinn, Carl-Heinz, 4,052,450, Cl. 260-533.00N.

Dumoulin, Jean, to Rhone-Poulenc S.A. Surface active composition. 4,052,331, Cl. 252-312.000.

Duncan, Ernest R. Teaching machine. 4,051,608, Cl. 35-48.00A.

Dunkelmann, Guenter: *See—*
Kast, Hellmut; and Dunkelmann, Guenter, 4,052,398, Cl. 260-256.40F.

Dunlop Holdings Limited: *See—*
French, Tom; Edwards, Reginald Harold; and Powell, Leslie Vernon, 4,051,885, Cl. 152-330.00L.

Dunlop Limited: *See—*
Bourne, Alan John; and Walton, Trevor John, 4,051,884, Cl. 152-330.00L.
Goodfellow, Anthony Gerald, 4,052,496, Cl. 264-251.000.

Dupeuble, Jean-Claude: *See—*
Gleyze, Jean; Dupeuble, Jean-Claude; and Forin, Roger, 4,051,650, Cl. 57-34.0HS.

Duplex Products, Inc.: *See—*
Wieman, Robert L., 4,051,995, Cl. 229-69.000.

Du Pont de Nemours, E. I., and Company: *See—*
D'Amore, Michael Brian; and Sleight, Arthur William, 4,052,332, Cl. 252-413.000.

Durham, Roger Owen. Audible enrichment bleed warning device for fuel-injected engines. 4,051,829, Cl. 123-198.00D.

Dynecology Incorporated: *See—*
Schulz, Helmut W., 4,052,173, Cl. 48-202.000.

Dysan Corporation: *See—*
Barber, John A.; Dion, C. Norman; and James, Richard N., 4,052,750, Cl. 360-135.000.

E. D. Bullard Company: *See*—
Daly, Noel, 4,051,555, Cl. 2-412.000.
E. & J. Gallo Winery: *See*—
Larkin, Kenneth A., 4,052,612, Cl. 250-237.00R.
E M I Limited: *See*—
Hounsfield, Godfrey Newbold, 4,052,618, Cl. 250-360.000.
E. R. Squibb & Sons, Inc.: *See*—
Breuer, Hermann; and Treuner, Uwe D., 4,052,554, Cl. 544-26.000.
Cimarusti, Christopher M., 4,052,422, Cl. 260-408.000.
Cushman, David W.; and Ondetti, Miguel Angel, 4,052,511, Cl. 424-274.000.
Stiller, Eric T.; Levine, Seymour D.; Principe, Pacifico A.; and Diassi, Patrick A., 4,052,436, Cl. 560-52.000.
Treuner, Uwe D., 4,052,393, Cl. 260-250.00Q.
Easter, William M.: *See*—
Naipawer, Richard E.; and Easter, William M., 4,052,341, Cl. 252-522.000.
Eastman Kodak Company: *See*—
Gourley, Robert Nicholas, 4,052,379, Cl. 260-155.000.
Hassall, Stephen J. T.; and White, Neil S., 4,052,049, Cl. 270-58.000.
Hochreiter, William Thomas; and Mindler, Fredric Alton, 4,052,730, Cl. 354-135.000.
Hopfner, Clemens; and Ort, Wolfgang, 4,052,726, Cl. 354-29.000.
Jakubowicz, Raymond F., 4,052,320, Cl. 210-516.000.
Masurekar, Prakash S.; and Goodhue, Charles T., 4,052,263, Cl. 195-66.00R.
Santilli, Domenic, 4,052,325, Cl. 252-62.10L.
Wilson, John Charles, 4,052,367, Cl. 260-63.0UY.
Eaton Corporation: *See*—
Crisenbery, Richard T.; and Tinholt, Thomas H., 4,051,936, Cl. 192-58.00B.
Eaton, David Crawford: *See*—
Brooks, John Langshaw; Eaton, David Crawford; and Williams, Barry, 4,052,392, Cl. 544-211.000.
Eaton, David L.: *See*—
Baker, Frederick G.; and Eaton, David L., 4,052,010, Cl. 241-20.000.
Eaton, Milton. HTW heating system having an electrode steam boiler as the direct source of HTW. 4,052,587, Cl. 219-295.000.
Eayakawa, Shigeru: *See*—
Hosomi, Fumio; Wasa, Kiyotaka; Eayakawa, Shigeru; and Nagai, Takeshi, 4,052,738, Cl. 358-128.000.
Ebert, Edward A. Device for heating thermoplastic eyeglass frames. 4,052,592, Cl. 219-521.000.
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Szantay, Csaba; Vedres, Andras; Thuranszky, Karoly; Balogh, Gyula; and Vedres nee Kozma, Maria, 4,052,403, Cl. 260-288.0CF.
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Sarem, Amir M.; Darr, Russell C.; Elchlepp, Dale L.; and Spratt, Robert B., 4,051,901, Cl. 166-270.000.
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Schafer, Curtiss R., 4,052,572, Cl. 179-107.00R.
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Boothman, David R.; and Elgar, Everett C., 4,052,744, Cl. 361-103.000.
Eli Lilly and Company: *See*—
Kukolja, Stjepan, 4,052,387, Cl. 544-22.000.
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Elliott, James I. Panelized structural system. 4,051,641, Cl. 52-262.000.
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Bergen, Gary Richard, 4,052,092, Cl. 292-172.000.
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Hounsfield, Godfrey Newbold, 4,052,619, Cl. 250-363.00S.
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Kuroishi, Shoji; Kimura, Tsuguo; Emoto, Masami; and Yamamoto, Shiro, 4,052,127, Cl. 355-3.0DD.
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Enderby, Ralph Thomas; Steel, Francis Robert; and Victor, Alan Michael, to Motorola, Inc. Extended phase-range, high fidelity modulator arrangement. 4,052,672, Cl. 325-147.000.
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Deguchi, Hidetaka; Wada, Hajime; Endo, Takaya; Kikuchi, Shoji; and Hori, Haruo, 4,052,212, Cl. 96-56.200.
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Blurton, Keith F.; and Sedlak, John M., 4,052,268, Cl. 204-1.00T.
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Krabetz, Richard; Engelbach, Heinz; Lebert, Ulrich; Frey, Walter; Duembgen, Gerd; Thiessen, Fritz; and Willersinn, Carl-Heinz, 4,052,450, Cl. 260-533.00N.
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Dickore, Karlfried; Engels, Hans Dieter; Kratzer, Hans; and Merz, Walter, 4,052,460, Cl. 260-593.00H.
Enger, Lars Sivert, to Aktiebolaget Electrolux. Evaporative precooler for an absorption refrigerating apparatus. 4,051,694, Cl. 62-490.000.
Erdmann, David P.; and Kurschner, Dennis L., to Honeywell Inc. Automatic vehicle monitoring system. 4,052,595, Cl. 235-92.0TC.
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Pastor, Sheldon Lee; Erickson, Milton E.; and Kahn, Donald D., 4,052,742, Cl. 360-96.000.
Erickson, V. Robert. Soft ice cream machine. 4,052,180, Cl. 62-188.000.
Erwin Sick Optik-Elektronik: *See*—
Sick, Erwin; and Hartman, Klaus, 4,052,120, Cl. 350-6.000.
Eschler, Hans; and Oberbacher, Rudolf, to Siemens Aktiengesellschaft. Techniques for producing an acousto-optical component or a wide-band ultrasonic component. 4,051,582, Cl. 29-25.350.
Eslien, Dean R.; and Salnick, James, to Ultra Plating Corporation. Methods for manufacturing pellet sizing screen rods. 4,052,270, Cl. 204-25.000.
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Espenscheid, Wilton F.; and Yan, Tsoung-Yuan, to Mobil Oil Corporation. Liquefaction of solid carbonaceous materials. 4,052,292, Cl. 208-8.000.
Esquivel, Lucy C. Mattress with modifiable cavity for pregnant women. 4,051,566, Cl. 5-91.000.
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Godot, Jean Marie, 4,051,601, Cl. 33-174.00P.
Estes, James D., to N L Industries, Inc. Selective firing system. 4,051,907, Cl. 175-4.550.
Estrada, Otto, to Acevedo, Ignacio. Machine for generating surfaces of various characteristics on workpieces. 4,051,751, Cl. 82-12.000.
Etchells, Sylvia, to Imperial Chemical Industries Limited. Process for producing conductive fiber. 4,052,493, Cl. 264-49.000.
Ethyl Corporation: *See*—
Licke, George C., 4,052,420, Cl. 260-351.000.
Licke, George C., 4,052,437, Cl. 560-25.000.
Niebylski, Leonard M., 4,052,171, Cl. 44-68.000.
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Lockwood, Harry Francis; and Ettenberg, Michael, 4,052,252, Cl. 156-622.000.
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Steine, Hans T.; Simm, Wolfgang; and Quaas, Joseph F., 4,052,531, Cl. 428-673.000.
Evans, David A., to University of California, The Regents of the. Prostaglandin intermediates. 4,052,434, Cl. 560-121.000.
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Massey, William A.; and Evans, Donald J., 4,052,646, Cl. 318-39.000.
Evergard Fire Alarm Company, Inc.: *See*—
Jacoby, Sidney, 4,052,690, Cl. 337-405.000.
Everman, Wayne F.; and Bernard, Vincent E., to Swift & Company. Method and apparatus for assembling items. 4,051,753, Cl. 83-29.000.

Every, Richard L., to Continental Oil Company. Low-temperature synthesis of urea. 4,052,503, Cl. 423-470.000.

Exclusive Envelope Corporation: *See—*
Ross, Martin I.; and Rogers, Arthur M., 4,051,996, Cl. 229-72.000.

Exner, Lawrence J.: *See—*
Rosenthal, Isadore; Exner, Lawrence J.; Niksa, Gregory J.; Weiss, Warren I.; and Young, Maurice G., 4,052,155, Cl. 8-14.000.

Exxon Research and Engineering Company: *See—*
Blume, John H.; and Bushnell, James D., 4,052,294, Cl. 208-33.000.
Shropshire, Joseph A.; and Newman, Gerald H., 4,052,539, Cl. 429-194.000.

Faber, Klaus, to Disogrin Industries, Inc. Piston seal. 4,052,112, Cl. 308-3.500.

Fabrica de Productos Quimicos y Farmaceuticos Abello, S.A.: *See—*
Calvo, Fernando, 4,052,402, Cl. 260-285.000.

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Herrin, Thomas Raymond; and Fairgrieve, John Scott, 4,052,439, Cl. 560-129.000.

Fairholme, Russel John, to Plessey Handel und Investments A.G. Circular magnetic domain devices. 4,052,708, Cl. 340-174.0TF.

Falk, Richard A. Molten metal stream sampler. 4,051,732, Cl. 73-425.40R.

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de Ruggieri, Pietro; and Sighinolfi, Orazio, 4,052,352, Cl. 260-239.55R.

Farstad, Lars. Anchor-wire arrangement. 4,051,800, Cl. 114-297.000.

Farwell, Harry Russell: *See—*
Black, James A.; Farwell, Harry Russell; and Porth, Frank L., 4,051,777, Cl. 101-123.000.

Fattori, Lazzaro A. Telescoping rotary latch and manufacture thereof. 4,052,093, Cl. 292-218.000.

Fechter, Harry Robert; and Hood, Peter. Sonic signalling transducer. 4,051,714, Cl. 73-40.50A.

Federal-Mogul Corporation: *See—*
Clark, William Eugene, 4,052,502, Cl. 264-293.000.
MacArthur, Samuel E.; and Smith, Stanley N., 4,052,077, Cl. 277-183.000.

Fedison, Walter W., to Ford Motor Company. Carburetor with manually adjustable fuel supply. 4,052,490, Cl. 261-34.00A.

Feeney, George W.; and Burroway, Gary L., to Goodyear Tire & Rubber Company, The. Adhesive composition and butadiene, styrene, acrylonitrile copolymer therefor. 4,052,483, Cl. 260-880.00R.

Feist, Donovan R., to Mill & Mix Company, Inc. Portable flour mill. 4,052,012, Cl. 241-100.000.

Feller, Peter, to Zellweger, Ltd. Method and apparatus for measuring irregularities in the cross-section of yarns, roving, bands and the like. 4,051,722, Cl. 73-160.000.

Felter, John V.; Taylor, Bill P., Jr.; and Rudine, Kenneth M. Ventilators for mobile homes, and the like. 4,051,770, Cl. 98-43.00B.

Feneberger, Kurt; and Gely, Rolf, to Lonza, Ltd. High-temperature lubricant for the hot-working of metals. 4,052,323, Cl. 252-23.000.

Fernandez, Eloy, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Dosing device on an ink fountain. 4,051,782, Cl. 101-365.000.

Ferneau, Richard H.: *See—*
Weil, Burt; and Ferneau, Richard H., 4,052,097, Cl. 296-20.000.

Fernley, George W.; and Stone, Cecil M., to Shell Oil Company. Secondary alkyl sulfate: alcohol ethoxylate mixtures. 4,052,342, Cl. 252-541.000.

Ferrari, Serge. Coating and calendaring of 2-dimensionally tensioned fabric. 4,052,521, Cl. 427-173.000.

Figiel, Francis J., to Allied Chemical Corporation. Azeotrope-like compositions of trichlorotrifluoroethane, ethanol, isopropanol and nitromethane. 4,052,328, Cl. 252-171.000.

Fikentscher, Rolf: *See—*
Dockner, Toni; Wallis, Albrecht; Fikentscher, Rolf; Thomas, Rainer; and Herzog, Reinhard, 4,052,384, Cl. 260-239.00E.
Fuerst, Ernst; Gerendas, Jozsef; Rokohl, Rudolf; Fikentscher, Rolf; and Helfert, Herbert, 4,052,159, Cl. 8-169.000.

Filzinger, Klaus: *See—*
Fuchs, Hermann; and Filzinger, Klaus, 4,052,157, Cl. 8-41.00R.

Finger, Gunther: *See—*
Hegemann, Karl-Rudolf; Finger, Gunther; Brinkmann, Albert; and Weissert, Helmut, 4,052,042, Cl. 266-89.000.

Finite Filter Company: *See—*
Berger, Leo Joseph, Jr.; and Guequierre, Denis D., 4,052,316, Cl. 210-315.000.

Finke, Manfred; and Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Process for preparing cyclic phosphinic acid esters. 4,052,486, Cl. 260-970.000.

Finot, Paul-Andre; Hirsbrunner, Pierre; and Bertholet, Raymond, to Societe d'Assistance Technique pour Produits Nestle S.A. Preparation of ε-(γ-glutamyl)-lysine. 4,052,372, Cl. 260-112.50R.

Firestone Tire & Rubber Company, The: *See—*
Crane, Grant; and Kay, Edward Leo, 4,052,344, Cl. 260-2.300.
Halasa, Adel Farhan; and Schulz, Donald Norman, 4,052,370, Cl. 260-77.5CR.
Halasa, Adel Farhan; and Gutierrez, Richard, 4,052,545, Cl. 526-140.000.

Fischer & Porter Co.: *See—*
Head, Victor P.; and Herzl, Peter J., 4,051,723, Cl. 73-194.00E.

Fish, Franklin H., to United States of America, Navy. High speed fiber optic communication link. 4,052,611, Cl. 250-199.000.

Fisher, Robert Clifford, to Cincinnati Milacron, Inc. Regulating wheel pivot adjusting device. 4,051,634, Cl. 51-103.00R.

Flasch, John Robert: *See—*
Lerner, Robert Wendell; Towers, Russell S.; and Flasch, John Robert, 4,052,428, Cl. 260-448.0AD.

Fleetwood Systems, Inc.: *See—*
Mojden, Wallace W.; Davila, Jose E.; Hooper, George W.; Kwiatkowski, Gerald M.; and Pantel, Howard W., Jr., 4,051,965, Cl. 214-16.40A.

Fleissner, Hans, to Vepa AG. Coupling for the supply and discharge of heating medium, for example in tentering units. 4,051,604, Cl. 34-124.000.

Flink, Herbert M.: *See—*
Ellison, John E.; and Flink, Herbert M., 4,051,861, Cl. 137-315.000.

Flow Ezy Filters, Inc.: *See—*
King, Charles, 4,052,312, Cl. 210-223.000.

Fluidrive Engineering Company Limited: *See—*
James, Walter Hugh Knight, 4,051,675, Cl. 60-330.000.

Fogle, James Oliver; and Fogle, Reiko Iwao. Two-side viewable kaleidosymmetric morphological puzzle game. 4,052,074, Cl. 273-157.00R.

Fogle, Reiko Iwao: *See—*
Fogle, James Oliver; and Fogle, Reiko Iwao, 4,052,074, Cl. 273-157.00R.

Foley, Howard K.; Hutchings, David A.; and Neubert, Terry C., to Goodyear Tire & Rubber Company, The. Process for polymerizing diolefin copolymers employing a catalyst mixture of hydroperoxides. 4,052,547, Cl. 526-212.000.

Fonzi, Frank, to Materials Technology Corporation. Co-deposited coating of aluminum oxide and titanium oxide and method of making same. 4,052,530, Cl. 428-552.000.

Forberg, Hans-Jurgen, to Transcodan, Sven Husted-Andersen. Multitube valve. 4,051,867, Cl. 137-595.000.

Ford Motor Company: *See—*
Fedison, Walter W., 4,052,490, Cl. 261-34.00A.
Lange, Julius, 4,052,671, Cl. 325-42.000.

Forin, Roger: *See—*
Gleyze, Jean; Dupeuble, Jean-Claude; and Forin, Roger, 4,051,650, Cl. 57-34.0HS.

Forman, Bruce Jan. Wax application device. 4,052,130, Cl. 401-2.000.

Forney Engineering Company: *See—*
Horn, Robert; and Slovacek, Raymond J., 4,052,602, Cl. 364-424.000.

Forster, Siegfried; Dibelius, Gunter; Hewing, Gunter; and Singh, Jasbir, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Method of operating a nuclear-power-generating installation with closed gas cycle and plant operated by this method. 4,052,260, Cl. 176-60.000.

Foster, Phillip H.: *See—*
DeLoach, Guessman L.; and Foster, Phillip H., 4,051,812, Cl. 119-51.110.

Foulkes, Stanley Charles, to Chloride Group Limited. Manufacture of tubular type battery plates. 4,051,876, Cl. 141-1.100.

4 - Share, Inc.: *See—*
Delo, William A.; and Nielsen, Raymond J., 4,052,227, Cl. 134-56.00R.

Franaszek, Peter Anthony, to International Business Machines Corporation. Apparatus for reordering the sequence of data stored in a serial memory. 4,052,704, Cl. 364-900.000.

Franetzki, Manfred; Korn, Volker; and Prestele, Karl, to Siemens Aktiengesellschaft. Apparatus for the determination of the respiratory passageway resistance. 4,051,843, Cl. 128-2.080.

Frankel, Donald P.; Kendall, Willard E.; and Cooper, John F., to Lake Geneva A & C Corporation. Store and burn incinerating toilet and method. 4,051,561, Cl. 4-131.000.

Frantz, Virgil L., to Graham-White Sales Corporation. Compressed air filter assembly. 4,052,178, Cl. 55-212.000.

Franz, William F.: *See—*
Cole, Edward L.; Hess, Howard V.; and Franz, William F., 4,052,169, Cl. 44-1.00R.

Fredd, John V., to Otis Engineering Corporation. Reset and pulling tool for manipulating well safety valve. 4,051,899, Cl. 166-217.000.

Fredriksson, Oke A., to Chevron Research Company. Method and apparatus for diagnosing faults in the geophone group of a geophysical data acquisition system. 4,052,694, Cl. 340-17.00R.

Freed, Paul S.: *See—*
Kantrowitz, Adrian; and Freed, Paul S., 4,051,840, Cl. 128-1.00D.

Freeman, Arthur W. Accentuator circuit for underwater acoustical devices. 4,052,692, Cl. 340-3.00R.

Freeman, David Bruce; Patton, Michael C.; and Dragan, Carl F., to Louis G. Freeman Company. Folding and sealing apparatus and method. 4,051,569, Cl. 12-146.0CK.

Frem Corporation: *See—*
Howitt, Robert T., 4,051,789, Cl. 108-152.000.

French, Tom; Edwards, Reginald Harold; and Powell, Leslie Vernon, to Dunlop Holdings Limited. Tire and wheel assemblies. 4,051,885, Cl. 152-330.00L.

Freudenschuss, Otto; and Kittag, Gerd, to Vockenhuber, Karl; and Hauser, Raimund. Motion picture camera. 4,052,126, Cl. 352-84.000.

Frey, Roberto Jose. Carburetor circuit for internal combustion engines. 4,052,489, Cl. 261-34.00A.

Frey, Walter: *See—*
Krabetz, Richard; Engelbach, Heinz; Lebert, Ulrich; Frey, Walter; Duembgen, Gerd; Thiessen, Fritz; and Willersinn, Carl-Heinz, 4,052,450, Cl. 260-533.00N.

Freygang, Hans-Joachim: *See—*
Schmitt, Reinhold; Freygang, Hans-Joachim; and Margaris, Panajotis, 4,052,668, Cl. 324-126.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Meyer, Gunter; Radke, Dietrich; and Reimann, Gunter, 4,052,195, Cl. 75-10.00R.
Friedenthal, Robert. Reusable karate striking board. 4,052,056, Cl. 272-76.000.
Friedman, Bernard. Cooking oil filtration. 4,052,319, Cl. 210-465.000.
Friedrich Frech: *See*—
Sinkovec, Andrej, 4,051,599, Cl. 33-27.00C.
Friedrich Grohe Armaturenfabrik: *See*—
Nordentoft, Lars, 4,051,870, Cl. 137-636.200.
Frolov, Mikhail Vladimirovich: *See*—
Baburin, Sergei Vyacheslavovich; Akimov, Vasily Ivanovich; Gorbushin, Vladimir Alexandrovich; Muraviev, Alexandr Petrovich; Nepein, Valery Nikolaevich; Frolov, Mikhail Vladimirovich; Aizenberg, Sergei Arnoldovich; Golovko, Evgeny Mikhailovich; Kamenev, Alexandr Fedorovich; and Sergeev, Igor Alexandrovich, 4,051,576, Cl. 19-156.000.
Fuchs, Hermann; and Filzinger, Klaus, to Hoechst Aktiengesellschaft. Use of water-soluble disazo dyestuffs for dyeing or printing synthetic textile material of polyamide or polyurethane fibers. 4,052,157, Cl. 8-41.00R.
Fuerst, Ernst; Gerendas, Jozsef; Rokohl, Rudolf; Fikentscher, Rolf; and Helfert, Herbert, to BASF Aktiengesellschaft. Dyeing process using quaternary ammonium salt as retarder. 4,052,159, Cl. 8-169.000.
Fuger, Karl E.: *See*—
Zajacek, John G.; McCoy, John J.; and Fuger, Karl E., 4,052,454, Cl. 260-553.00A.
Fuji Giken Kabushiki Kaisha: *See*—
Hasegawa, Kaiichi; and Sanuga, Fumio, 4,052,053, Cl. 271-187.000.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Mogi, Minoru; and Matsumoto, Shoichi, 4,051,823, Cl. 123-117.00A.
Sugiura, Katsuhiko, 4,051,824, Cl. 123-119.00A.
Fuji Photo Film Co., Ltd.: *See*—
Inoue, Eiichi; Kokado, Hiroshi; Yamaguchi, Takashi; Tokunaga, Yukio; Nakayama, Takao; and Yamase, Toshihiro, 4,052,211, Cl. 96-35.000.
Oishi, Yasushi; and Yoshida, Yoshinobu, 4,052,214, Cl. 96-74.000.
Sera, Hidefumi; Yamamoto, Nobuo; Horie, Ikutaro; Nagao, Kameji; and Iwasaki, Nobuyuki, 4,052,373, Cl. 260-117.000.
Fujimoto, Isao; Kasubuchi, Takeshi; Aiba, Masahiko; and Shimazawa, Yoichi, to Nippon Telegraph and Telephone Public Corporation; and Sharp Kabushiki Kaisha. Electronic tabulator for high speed printers. 4,051,945, Cl. 197-176.000.
Fujita, Osamu, to Matsushita Electric Industrial Co., Ltd. Vertical deflection circuit. 4,052,645, Cl. 315-388.000.
Fukai, Masakazu: *See*—
Fukuda, Yoji; Fukushima, Fumio; Tsujimoto, Yoshinobu; Fukai, Masakazu; and Sugai, Shinji, 4,052,329, Cl. 252-301.40F.
Fukuda, Kenji: *See*—
Nakamura, Tatsuji; Fukuda, Kenji; Tsuji, Toshihiko; Maruyama, Takeo; Sakai, Ryouji; Sawada, Shohei; and Miyoshi, Haruki, 4,052,588, Cl. 219-345.000.
Fukuda, Yoji; Fukushima, Fumio; Tsujimoto, Yoshinobu; Fukai, Masakazu; and Sugai, Shinji, to Matsushita Electric Industrial Co., Ltd. Method of preparing cerium-activated yttrium silicate phosphor. 4,052,329, Cl. 252-301.40F.
Fukumoto, Ryoichi; and Igarashi, Toshiro, to Aisin Seiki Kabushiki Kaisha; and Toyota Shatai Kabushiki Kaisha. Window glass mounting means for automobiles. 4,051,632, Cl. 49-348.000.
Fukushima, Fumio: *See*—
Fukuda, Yoji; Fukushima, Fumio; Tsujimoto, Yoshinobu; Fukai, Masakazu; and Sugai, Shinji, 4,052,329, Cl. 252-301.40F.
Fulkerson, David Wilham; and Smith, Lawrence William. Self-propelled percussion unit for driving cemetery markers and method of using same. 4,051,684, Cl. 61-53.500.
Fulton, Kent H.: *See*—
Harakas, Nicholas K.; Fulton, Kent H.; Tierney, Paul A.; and Bender, Malcolm F., 4,052,524, Cl. 428-383.000.
Furukawa, Yoshiyasu; and Miyashita, Osamu, to Takeda Chemical Industries, Ltd. 3-(Disubstituted)aminoisothiazolo[3,4-d]pyrimidines. 4,052,391, Cl. 544-117.000.
Gadekar, Shreekrishna M., to Affiliated Medical Research, Inc. Method for reducing serum uric acid levels. 4,052,509, Cl. 424-263.000.
Gaetani, Ermanno; and Ponzini, Sandro, to Aziende Colori Nazionali Affini ACNA S.p.A. Trisazo dyes containing two different aminonaphtholsulphonic acid coupler components. 4,052,380, Cl. 260-169.000.
Gagliardi, Joseph A. Foldable caster chair for the handicapped. 4,052,087, Cl. 280-650.000.
Galinat, Walton C., to Research Corporation. Hybrid seed production. 4,051,629, Cl. 47-58.000.
Galloup, Clifford L.: *See*—
Baker, William J.; and Galloup, Clifford L., 4,051,875, Cl. 140-124.000.
Garcia Corporation, The: *See*—
Chalmers, Edward L., 4,051,611, Cl. 36-50.000.
Garcia, Steve, to Donofrio, James W., a part interest. Mail reminder. 4,051,997, Cl. 232-35.000.
Gardner-Denver Company: *See*—
Baker, William J.; and Galloup, Clifford L., 4,051,875, Cl. 140-124.000.
Shoop, John C.; Post, Roger L.; and Herschler, Michael G., 4,052,135, Cl. 417-295.000.
Garnett-McKeen Chemical Corporation: *See*—
Garnett, Merrill, 4,051,804, Cl. 116-114.500.
Garnett, Merrill, to Garnett-McKeen Chemical Corporation. Thaw-indicator device. 4,051,804, Cl. 116-114.500.
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Gaylord, John A., to H. Koch & Sons, Inc. Box webbing adjuster. 4,051,743, Cl. 74-242.800.
Geering, Emil J.: *See*—
Dannels, Bobby F.; and Geering, Emil J., 4,052,281, Cl. 204-159.220.
Gehring, Robert L.: *See*—
Ohmeis, Peter M.; Gehring, Robert L.; and Hahn, Roger A., 4,051,878, Cl. 141-82.000.
Geier, Horst W. Rotary mower. 4,051,647, Cl. 56-13.400.
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Schreyer, Gerd; Geiger, Friedhelm; and Hensel, Jorg, 4,052,445, Cl. 260-513.00R.
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General Aluminum Products, Incorporated: *See*—
Trumley, Richard L.; and Linn, Randy W., 4,051,626, Cl. 47-17.000.
General Battery Corporation: *See*—
Devitt, John L., 4,052,534, Cl. 429-86.000.
General Electric Company: *See*—
Ashley, Eugene, 4,051,762, Cl. 89-7.000.
Bale, Richard W., 4,051,595, Cl. 29-596.000.
Hamstra, David C., 4,052,624, Cl. 307-252.00B.
Hicks, Robert E., 4,051,586, Cl. 29-157.3AH.
Hueschen, Robert E.; and Port, John H., 4,052,640, Cl. 313-330.000.
Jensen, Neil John; Nivas, Yogesh; and Packard, Douglas Randall, 4,052,330, Cl. 252-301.10R.
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Love, Robert J.; and Graff, James C., 4,052,638, Cl. 313-318.000.
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Strok, Jack M., 4,052,636, Cl. 313-217.000.
General Motors Corporation: *See*—
Amann, Charles A., 4,051,821, Cl. 123-97.00B.
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Banker, William W., 4,052,110, Cl. 303-36.000.
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Hedderich, Fred L.; and George, Curtis C., 4,052,080, Cl. 280-47.260.
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Ehrlich, Stanley V.; and Ehrlich, John T., 4,052,013, Cl. 241-101.200.
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Kleine, Werner Kurt M., 4,051,905, Cl. 173-104.000.
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Shepard, Marshall Howard, 4,052,751, Cl. 361-50.000.
Gilmour, George A., to Westinghouse Electric Corporation. Depth sounder. 4,052,693, Cl. 340-3.00R.
Gindele, William E. Folding table. 4,051,788, Cl. 108-125.000.
Ginnow, Edward F.: *See*—
Woodfill, William L.; and Ginnow, Edward F., 4,051,801, Cl. 115-12.00R.
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Givens, Edwin Neil; Plank, Charles Joseph; and Rosinski, Edward

Joseph, to Mobil Oil Corporation. Mordenite conversion of alkanols to penta- and hexamethyl benzenes. 4,052,472, Cl. 260-668.00B.
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Gladstone, Shaul; Rao, Srinivasa R.; and Rosshirt, C. Joseph, to Witco Chemical Corporation. Method for preparing mercapto propionic acid esters and polythio dipropionic acid esters. 4,052,440, Cl. 560-154.000.
Glennan, Michael John. Shearing apparatus. 4,051,760, Cl. 83-801.000.
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Goad, Bobby F., to Baker International Corporation. Single string hanger system. 4,051,894, Cl. 166-73.000.
Godot, Jean Marie, to Essilor International, Cie Generale d'Optique. Feeler for contour reading apparatus. 4,051,601, Cl. 33-174.00P.
Goff, David C. Heating unit and fertilizer preparation. 4,052,167, Cl. 44-1.00R.
Gold, Elijah H.; and Solomon, Daniel M., to Schering Corporation. N-diphenylalkyl-2-benzyl azacyclic compounds. 4,052,383, Cl. 260-239.00A.
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Kreahling, Robert P.; Casey, Donald J.; and Goldenberg, David Z., 4,052,501, Cl. 264-290.00T.
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Goodfellow, Anthony Gerald, to Dunlop Limited. Method of making a tire by first molding a tread and then molding separate sidewalls onto the tread. 4,052,496, Cl. 264-251.000.
Goodhue, Charles T.: *See*—
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Goodyear Tire & Rubber Company, The: *See*—
Albareda, Angel Ramon Terrado; and Schoellen, Joseph, 4,052,246, Cl. 156-412.000.
Appleby, Paul E.; Houck, Stanley J.; and Nash, Richard B., 4,052,237, Cl. 156-117.000.
Enabnit, Robert S., 4,052,696, Cl. 340-58.000.
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Goralski, Christian T.; Klingler, Thomas C.; and Wolf, Paul A., to Dow Chemical Company, The. Dibromonitromethyl methyl sulfone slimicide. 4,052,258, Cl. 162-161.000.
Gorbushin, Vladimir Alexandrovich: *See*—
Baburin, Sergei Vyacheslavovich; Akimov, Vasily Ivanovich; Gorbushin, Vladimir Alexandrovich; Muraviev, Alexandr Petrovich; Nepein, Valery Nikolaevich; Frolov, Mikhail Vladimirovich; Aizenberg, Sergei Arnoldovich; Golovko, Evgeny Mikhailovich; Kamenev, Alexandr Fedorovich; and Sergeev, Igor Alexandrovich, 4,051,576, Cl. 19-156.000.
Gordon, Alfred A.: *See*—
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Gottfried Bischoff Bau kompl. Gasreiningungs-und Wasserruckkuhlungs-Anlagen Kommanditengesellschaft: *See*—
Hegemann, Karl-Rudolf; Finger, Gunther; Brinkmann, Albert; and Weissert, Helmut, 4,052,042, Cl. 266-89.000.
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Gourley, Robert Nicholas, to Eastman Kodak Company. Dyes from trifluoromethyl-2-aminobenzothiazole diazo components. 4,052,379, Cl. 260-155.000.
Gow Enterprises Limited: *See*—
Westerlund, G. Oscar, 4,052,287, Cl. 204-237.000.
Graf, Felix; and Moser, Louis, to Rieter Machine Works, Ltd. Apparatus for applying preparation agents to a bundle of filaments. 4,051,807, Cl. 118-401.000.
Graff, James C.: *See*—
Love, Robert J.; and Graff, James C., 4,052,638, Cl. 313-318.000.
Graham-White Sales Corporation: *See*—
Frantz, Virgil L., 4,052,178, Cl. 55-212.000.
Gramkow, Asger, to Danfoss A/S. Starting device for a single-phase motor. 4,052,650, Cl. 318-221.00H.
Granger, Floyd Randolph; and Granger, Michael Gerard. Environmentally heated and cooled building. 4,051,999, Cl. 237-1.00A.
Granger, Michael Gerard: *See*—
Granger, Floyd Randolph; and Granger, Michael Gerard, 4,051,999, Cl. 237-1.00A.
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Muller, Hans, 4,052,052, Cl. 271-157.000.
Grass, Henry G., to Grass, James L.; and Grass, William H., part interest to each. Folding spray boom. 4,052,006, Cl. 239-168.000.
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Grass, Henry G., 4,052,006, Cl. 239-168.000.
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Grass, Henry G., 4,052,006, Cl. 239-168.000.
Grasselli, Robert K.: *See*—
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Grat, Felix R., to Hacker Instruments, Inc. Apparatus for sharpening blade edges. 4,052,174, Cl. 51-81.0BS.
Gray, Don N.; and Guilbault, George G., to Owens-Illinois, Inc. Solid sensor electrode. 4,052,286, Cl. 204-195.00R.
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Hauptmann, Edward G.; and Green, John Richard, 4,051,952, Cl. 209-73.000.
Greenwell, Jack E.; and Prokop, Alexander, to Lear Motors Corporation. Hand held variable speed drill motor and control system therefor. 4,052,649, Cl. 318-212.000.
Greenwood, Helen. Scouring mitten. 4,051,572, Cl. 15-227.000.
Gregory, Richard Langton; and Low, Ian Alexander, to National Research Development Corporation. Hearing aid with amplitude compression achieved by clipping a modulated signal. 4,052,571, Cl. 179-107.00R.
Griesemer, Douglas Earl, to RCA Corporation. Cathode-ray tube screening exposure method. 4,052,725, Cl. 354-1.000.
Griffith, Joseph W. Method and apparatus for purifying process waste emissions. 4,052,266, Cl. 201-15.000.
Griffiths, Frank Anthony, to Decca Limited. Line-sequential color television encoding and decoding system. 4,052,736, Cl. 358-37.000.
Griset, Ernest, Jr., to Akzona Incorported. Yarns and their method of manufacture. 4,051,660, Cl. 57-140.0BY.
Groth, Volker; Stradmann, Adolf; and Pelzel, Erich, to Rheinisches Zinkwalzwerk GmbH & Co. KG. Process for producing sheets and strip of zinc-copper-titanium alloy. 4,051,887, Cl. 164-76.000.
Gruber, Paul, to Cincinnati Milacron, Inc. Wheel dressing apparatus and method. 4,051,830, Cl. 125-11.00R.
Gruenwald, Clifford F., to Snap-On Tools Corporation. Capacitive pickup device for pulsating high voltage measurements. 4,052,665, Cl. 324-54.000.
Grundmann, Edgard, to Volkswagenwerk Aktiengesellschaft. Sound-damping housing. 4,051,917, Cl. 181-200.000.
Grunthaner, Frank J.: *See*—
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GTE Sylvania Incorporated: *See*—
Kimball, Stephen F.; and Gates, Paul E., 4,052,687, Cl. 337-25.000.
Wheeler, Robert Charles, 4,052,735, Cl. 358-28.000.
Gudea, Dumitru, to Triner Scale and Manufacturing Company. Electronic postage scale. 4,051,913, Cl. 177-25.000.
Gudish, Anthony. Portable convertible sofa-bunk beds. 4,051,564, Cl. 5-9.00R.
Guequierre, Denis D.: *See*—
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Guglielmetti, Robert: *See*—
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Guibert, Raul. Air curtain-projecting ventilator. 4,051,893, Cl. 165-125.000.
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Montagna, Angelo Anthony, 4,052,296, Cl. 208-216.000.
Schulz, J. Gustav; and Sabourin, Edward T., 4,052,448, Cl. 260-515.00H.
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Hayer, John R., 4,052,628, Cl. 310-333.000.

Gumbinner, Robert; and Huang, Jen-Chi, to Polychrome Corporation. Process for electrolytic graining of aluminum sheet. 4,052,275, Cl. 204-129.950.
Gunn, Walter H., to Diamond Shamrock Corporation. Stable colloid solution and method of making same. 4,052,231, Cl. 148-6.200.
Gupton, John T.: *See*—
Blackwell, J. Thomas; Gupton, John T.; and Nabors, Jim B., 4,052,397, Cl. 260-251.00R.
Gutierrez, Richard: *See*—
Halasa, Adel Farhan; and Gutierrez, Richard, 4,052,545, Cl. 526-140.000.
GX-Holding AG.: *See*—
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Gyogyszerkutato Intezet: *See*—
Ambrus, Gabor; Barta, Istvan; Mehesfalvi, Zsuzsanna, nee Vajna; and Horvath, Gyula, 4,052,407, Cl. 260-302.00R.
H. Ernault-Somua: *See*—
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H. Koch & Sons, Inc.: *See*—
Gaylord, John A., 4,051,743, Cl. 74-242.800.
H. O. Trerice Co.: *See*—
Andrews, Richard A.; and Noakes, Thomas E., 4,051,730, Cl. 73-416.000.
Haapala, Ray. Garland marker for fancy cakes. 4,051,600, Cl. 33-174.00T.
Haas, David J., to North American Philips Corporation. Object viewing system with radiation responsive screen system. 4,052,621, Cl. 250-458.000.
Haass, Adolf, to Siemens Aktiengesellschaft. Circuit arrangement for balancing a two wire full duplex data transmission system. 4,052,556, Cl. 178-60.000.
Habermeier, Jurgen; Batzer, Hans; and Porret, Daniel, to Ciba-Geigy Corporation. Polyglycidyl compounds containing N-heterocyclic structure. 4,052,366, Cl. 260-63.00R.
Hackbarth, Lowell E.; Pyle, Sterling W.; and Brandon, Paul W., to J. M. Huber Corporation. Spray dryer discharge system. 4,052,255, Cl. 159-4.00B.
Hacker Instruments, Inc.: *See*—
Grat, Felix R., 4,052,174, Cl. 51-81.0BS.
Hafner, Lee A.: *See*—
Beiter, Charles B.; and Hafner, Lee A., 4,052,354, Cl. 260-29.60M.
Hahn, Roger A.: *See*—
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Haines, Ralph Warren: *See*—
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Hajos, Zoltan George, to Hoffmann-La Roche, Inc. Stereospecific total steroidal synthesis via substituted c/d-trans indanones. 4,052,413, Cl. 260-340.9AS.
Halasa, Adel Farhan; and Schulz, Donald Norman, to Firestone Tire & Rubber Company, The. Alkali metal aliphatic and aromatic hydrocarbon acetals and ketals and their use as polymerization initiators. 4,052,370, Cl. 260-77.5CR.
Halasa, Adel Farhan; and Gutierrez, Richard, to Firestone Tire & Rubber Company, The. Process for polymerizing conjugated dienes. 4,052,545, Cl. 526-140.000.
Hales, Pryce Neilson: *See*—
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Hall, Carroll D. Modified rankine cycle engine apparatus. 4,051,680, Cl. 60-689.000.
Halm Instrument Co., Inc.: *See*—
Harrison, Henry, 4,051,891, Cl. 165-54.000.
Halter, Richard F.; and DeWeese, Richard L., to Cincinnati Incorporated. Method for hot forging finished articles from powder metal preforms. 4,051,590, Cl. 29-420.500.
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Hamstra, David C., to General Electric Company. Ramp and pedestal control circuit. 4,052,624, Cl. 307-252.00B.
Hanazono, Masami; Hishida, Yukio; Nakai, Toshio; Watanabe, Tomoyoshi; Hirayama, Takanobu; and Asakura, Hideo, to Brother Industries, Ltd. Ribbon cartridge. 4,051,943, Cl. 197-151.000.
Hand, Ronnie D.; Chappelear, Robert N.; and Mueller, Dale R., to Owens-Corning Fiberglas Corporation. Filament winding apparatus. 4,052,015, Cl. 242-18.00G.
Hankins, Dale. Propping material for hydraulic fracturing. 4,051,900, Cl. 166-250.000.
Hanna, Daniel C. Apparatus for waxing cars. 4,051,806, Cl. 118-63.000.
Harakas, Nicholas K.; Fulton, Kent H.; Tierney, Paul A.; and Bender, Malcolm F., to Monsanto Company. Method for improving adhesive bonding in steel/rubber composites and article. 4,052,524, Cl. 428-383.000.
Harbulak, Edward P.; and Lash, Ronald J., to M & T Chemicals Inc. Stripping of electroplated nickel-iron alloys from ferrous substrates. 4,052,254, Cl. 156-664.000.
Harcuba, Siegfried; and Dits, Herbert, to Harcuba, Siegfried. Heated cutter for plastics materials. 4,051,754, Cl. 83-124.000.
Hardy, Gilbert F. Spring loop key ring and method and apparatus for making same. 4,051,874, Cl. 140-88.000.
Harper-Wyman Company: *See*—
Sekera, George F., Jr.; and Cousins, Otto J., 4,052,591, Cl. 219-506.000.
Harris, Alva F.; and Shapras, Peter, to Monsanto Company. Molding compositions. 4,052,348, Cl. 260-5.000.
Harrison, Henry, to Halm Instrument Co., Inc. Heat transfer block means. 4,051,891, Cl. 165-54.000.
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Hartman, Robert J.: *See*—
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Hasegawa, Akira: *See*—
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Hasegawa, Kaiichi; and Sanuga, Fumio, to Fuji Giken Kabushiki Kaisha. Stacker drum of sheet accumulating device. 4,052,053, Cl. 271-187.000.
Hasegawa, Katsuji, to Meinan Machinery Works, Inc. Method of processing undried veneer sheet. 4,051,882, Cl. 144-309.00D.
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Haslbeck, Joseph: *See*—
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Hassall, Stephen J. T.; and White, Neil S., to Eastman Kodak Company. Card injecting apparatus. 4,052,049, Cl. 270-58.000.
Hastbacka, Albin A. Electro-optical liquid level indicator. 4,051,726, Cl. 73-290.00R.
Hattori, Tadashi; Nakase, Takamichi; and Nishida, Minoru, to Nippon Soken, Inc. Fuel injection system for an internal combustion engine. 4,051,817, Cl. 123-32.0EA.
Hattori, Yasuhiro: *See*—
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Hauni-Werke Korber & Co. KG: *See*—
Schumacher, Peter; and Niemann, Helmut, 4,051,947, Cl. 198-478.000.
Hauptmann, Edward G.; and Green, John Richard, to Neptune Dynamics Ltd. Fish characteristic detecting and sorting apparatus. 4,051,952, Cl. 209-73.000.
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Freudenschuss, Otto; and Kittag, Gerd, 4,052,126, Cl. 352-84.000.
Hausmann, Erich. Steel boat hull salvaging assembly. 4,051,797, Cl. 114-51.000.
Hawkins, Harold M., deceased (by Hawkins, Marjorie W., executrix), to Phillips Petroleum Company. Method for preparation of alkyl-substituted butadienes. 4,052,478, Cl. 260-681.000.
Hawkins, Marjorie W., executrix: *See*—
Hawkins, Harold M., deceased, 4,052,478, Cl. 260-681.000.
Hay, Andrew George, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Hydraulic hammers hydraulically driven impactor. 4,052,107, Cl. 299-62.000.
Hay-Mar Corporation, The: *See*—
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Hayakawa, Daishiro; and Tani, Kenroku, to Matsushita Electric Industrial Co., Ltd. Ultrasonic ceramic microphone. 4,052,627, Cl. 310-322.000.
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Hayashi, Masaki; Kori, Seiji; and Wakatsuka, Hirohisa, to Ono Pharmaceutical Co., Ltd. Prostaglandin analogues. 4,052,512, Cl. 424-305.000.
Hayashida, Yoshihiro, to Tokico Ltd. Automatic shoe clearance adjusting device in shoe drum brake. 4,051,928, Cl. 188-79.50P.
Hayden/Arn Productions Limited: *See*—
Arn, Robert M., 4,051,665, Cl. 58-50.00R.
Hayer, John R., to Gulton Industries, Inc. Dynamic, shear-mode piezoelectric pressure sensor. 4,052,628, Cl. 310-333.000.
Haytayan, Harry M. Control valves. 4,051,862, Cl. 137-454.200.
Hayward, Alan Thomas Joseph, to United Kingdom of Great Britain and Northern Ireland, Secretary of State for Industry in Her Britannic Majesty's Government of the. Calibration apparatus for gas flowmeters. 4,051,711, Cl. 73-3.000.
Hazel, Patrick Michael; and Wells, Roberta Evans, to International Medical Corporation. Electrode and interfacing pad for electrical physiological systems. 4,051,842, Cl. 128-2.06E.
Head, Victor P.; and Herzl, Peter J., to Fischer & Porter Co. Force-type flowmeter. 4,051,723, Cl. 73-194.00E.
Headlee, Gordon C.: *See*—
Sedgwick, Jarvis D.; and Headlee, Gordon C., 4,051,967, Cl. 214-505.000.
Hebert, Donald G., to Xerox Corporation. Matrix print head with improved armature retainer. 4,051,941, Cl. 197-1.00R.
Heckl, Leonhard; Liedek, Egon; and Ruff, Wolfgang, to BASF Farben + Fasern AG. Red pigment obtained by coupling diazotized 4-aminonaphthalimide with 2,6-dihydroxy-3-cyano-4-methylpyridine. 4,052,378, Cl. 260-155.000.
Hectors, Adrianus M. P., to Oce-van der Grinten N.V. Electrophoto-

graphic copying process and reproduction element. 4,052,210, Cl. 96-1.50R.
Hedderich, Fred L.; and George, Curtis C. Cart for livestock. 4,052,080, Cl. 280-47.260.
Hegbar, Howard R.: *See—*
Arnold, John B.; Bowyer, John M.; Hegbar, Howard R.; and Shaefer, Archie B., 4,052,717, Cl. 340-249.000.
Hegemann, Karl-Rudolf; Finger, Gunther; Brinkmann, Albert; and Weissert, Helmut, to Gottfried Bischoff Bau kompl. Gasreiningungs- und Wasserruckkuhlungs-Anlagen Kommanditengesellschaft. Apparatus for cleaning blast-furnace exhaust gases. 4,052,042, Cl. 266-89.000.
Heimbach, Paul: *See—*
Wilke, Gunther; and Heimbach, Paul, 4,052,435, Cl. 560-128.000.
Heimberger, Helmut, to Optilon W. Erich Heilmann GmbH. Slide fastener support and method of warp-knitting same. 4,051,579, Cl. 24-205.16R.
Heine, Karlheinz, to Siemens Aktiengesellschaft. Method and apparatus for grinding turbine and compressor blades to dimension. 4,051,636, Cl. 51-145.00R.
Heintz, Carlo: *See—*
Colling, Joseph; Heintz, Carlo; and Unbekand, Alfred, 4,052,044, Cl. 266-225.000.
Heintz, Robert J. Removable enclosure for a swimming pool or the like. 4,051,638, Cl. 52-63.000.
Heinz, Henry, Jr., to Union Carbide Corporation. Pressure relief flapper vent valve for galvanic cells. 4,052,533, Cl. 429-54.000.
Heinz, Peter H.: *See—*
Atwood, John G.; Marshall, Hamilton W., Jr.; and Heinz, Peter H., 4,052,161, Cl. 23-230.00R.
Helberg, Jurgen: *See—*
Klein, Rainer; and Helberg, Jurgen, 4,052,301, Cl. 210-51.000.
Helfert, Herbert: *See—*
Fuerst, Ernst; Gerendas, Jozsef; Rokohl, Rudolf; Fikentscher, Rolf; and Helfert, Herbert, 4,052,159, Cl. 8-169.000.
Heller, Lawrence Griffith; and White, James Merrill, to International Business Machines Corporation. Charge transfer device transversal filters. 4,052,606, Cl. 364-825.000.
Hendry, Donald H.; and Johnson, Bruce K., to Polaroid Corporation. Modular photographic system assembly. 4,052,728, Cl. 354-86.000.
Henkin, Melvyn Lane. Anesthesia rebreathing apparatus. 4,051,847, Cl. 128-145.600.
Hensel, Jorg: *See—*
Schreyer, Gerd; Geiger, Friedhelm; and Hensel, Jorg, 4,052,445, Cl. 260-513.00R.
Henstrom, Sten. Rotary block engine. 4,051,819, Cl. 123-44.00B.
Herman Miller, Inc.: *See—*
Propst, Robert L., 4,052,084, Cl. 280-408.000.
Propst, Robert L.; and Wodka, Michael A., 4,052,564, Cl. 179-1.50M.
Hermann Berstorff Maschinenbau GmbH: *See—*
Brand, Wilhelm, 4,052,038, Cl. 366-90.000.
Herrin, Thomas Raymond; and Fairgrieve, John Scott, to Abbott Laboratories. Carboxylic esters of phosphonoacetic acid. 4,052,439, Cl. 560-129.000.
Herring, James A.: *See—*
Martin, William F., 4,052,311, Cl. 210-223.000.
Herschler, Michael G.: *See—*
Shoop, John C.; Post, Roger L.; and Herschler, Michael G., 4,052,135, Cl. 417-295.000.
Hertl, William; and Odstrchel, Gerald, to Corning Glass Works. Assay for thyroxine binding globulin. 4,052,504, Cl. 424-1.000.
Herzer, William P.; and Cullen, Robert E., to Union Special Corporation. Automatic sewing machine. 4,051,794, Cl. 112-121.12C.
Herzl, Peter J.: *See—*
Head, Victor P.; and Herzl, Peter J., 4,051,723, Cl. 73-194.00E.
Herzog, Gerald Bernard, to RCA Corporation. Combined controlled oscillator and frequency multiplier. 4,052,673, Cl. 325-153.000.
Herzog, Reinhard: *See—*
Dockner, Toni; Wallis, Albrecht; Fikentscher, Rolf; Thomas, Rainer; and Herzog, Reinhard, 4,052,384, Cl. 260-239.00E.
Hess, Howard V.: *See—*
Cole, Edward L.; Hess, Howard V.; and Franz, William F., 4,052,169, Cl. 44-1.00R.
Hesston Corporation: *See—*
Burkhart, Merle Keith; White, Bruce Lynn; Goossen, La Vern Roy; White, Allen Andrew; and Voth, Harold William, 4,052,011, Cl. 241-30.000.
Hestily, Charles E., to Singer Company, The. Dustless routers. 4,051,880, Cl. 144-252.00R.
Heusler, Karl; and Woodward, Robert Burns, to Ciba-Geigy Corporation. Oxyacetic acid compounds and process for their manufacture. 4,052,408, Cl. 260-306.70C.
Hewing, Gunter: *See—*
Forster, Siegfried; Dibelius, Gunter; Hewing, Gunter; and Singh, Jasbir, 4,052,260, Cl. 176-60.000.
Hewlett-Packard Company: *See—*
Maitland, David Steven; and Thayer, Billy E., 4,052,604, Cl. 364-786.000.
Hicks, Robert E., to General Electric Company. Method and apparatus for manufacturing a helically finned heat exchanger. 4,051,586, Cl. 29-157.3AH.
Higginbottom, Harold P., to Monsanto Company. Dilutable resole resin solutions having stabilized dispersed inert salts. 4,052,359, Cl. 260-17.500.
Higgs, Edward Wilford. Contamination entrapment and cleaning device for motor vehicle engine liquid cooling system coolant. 4,052,308, Cl. 210-167.000.
Higham, Peter; and Hoult, Robert Alan, to Perkin-Elmer Corporation, The. Nuclear magnetic resonance probe. 4,052,661, Cl. 324-.50R.
Highley, John, to Coal Industry (Patents) Limited. Method of and apparatus for generating a hot gas. 4,052,140, Cl. 431-7.000.
Higuchi, Takeru; and Hussain, Anwar, to Alza Corporation. Ocular therapeutic system manufactured from copolymer. 4,052,505, Cl. 424-14.000.
Hilfiker Pipe Co.: *See—*
Hilfiker, William K., 4,051,570, Cl. 14-26.000.
Hilfiker, William K., to Hilfiker Pipe Co. Road bridge construction with precast concrete modules. 4,051,570, Cl. 14-26.000.
Hill, Albert Charles, to Girling Limited. Vehicle brakes. 4,051,737, Cl. 74-110.000.
Hill, Homer G.; and Austin, Kenneth L., to Owens-Corning Fiberglas Corporation. Method of producing glass mats. 4,052,257, Cl. 162-156.000.
Hilti Aktiengesellschaft: *See—*
Chromy, Franz; Winkler, Walter; Mahr, Manfred; and Mark, Fritz, 4,051,990, Cl. 227-10.000.
Hinson-Rider, George. Solar heating pipe. 4,051,835, Cl. 126-271.000.
Hintz, Ronald E. Pistol draw target. 4,052,058, Cl. 273-1.00R.
Hirano, Satoru; Kubota, Atsushi; Yoshida, Mitsuru; Mizuno, Junzi; and Miyamoto, Nobutaka, to Kanebo, Limited. Method and apparatus for packaging yarn packages doffed from a yarn producing machine. 4,051,652, Cl. 57-52.000.
Hirano, Yoshihiko: *See—*
Yoshida, Minoru; Yamaguchi, Susumu; and Hirano, Yoshihiko, 4,052,276, Cl. 204-130.000.
Hirayama, Takanobu: *See—*
Hanazono, Masami; Hishida, Yukio; Nakai, Toshio; Watanabe, Tomoyoshi; Hirayama, Takanobu; and Asakura, Hideo, 4,051,943, Cl. 197-151.000.
Hirogami, Katsuhiko: *See—*
Nakaoka, Kazuhide; Araki, Kenji; Takada, Yoshikazu; Osaka, Shinobu; and Hirogami, Katsuhiko, 4,052,235, Cl. 148-156.000.
Hiromoto, Yoshinori: *See—*
Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, 4,052,632, Cl. 219-137.00R.
Hirsbrunner, Pierre: *See—*
Finot, Paul-Andre; Hirsbrunner, Pierre; and Bertholet, Raymond, 4,052,372, Cl. 260-112.50R.
Hishida, Yukio: *See—*
Hanazono, Masami; Hishida, Yukio; Nakai, Toshio; Watanabe, Tomoyoshi; Hirayama, Takanobu; and Asakura, Hideo, 4,051,943, Cl. 197-151.000.
Hitachi, Ltd.: *See—*
Anzai, Masayasu, 4,052,206, Cl. 96-1.00R.
Yamazaki, Eiichi; Ogura, Iwao; Ueda, Toshio; Maruyama, Koichi; and Shimizu, Kenji, 4,052,122, Cl. 350-189.000.
Yamazaki, Eiichi; Ueda, Toshio; and Maruyama, Koichi, 4,052,123, Cl. 350-189.000.
Yamazaki, Eiichi; Kanai, Hiromi; and Hurukawa, Toshio, 4,052,643, Cl. 315-16.000.
Ho, Hoi, to Marigold Enterprises Ltd. Cover for a container. 4,051,984, Cl. 222-471.000.
Hochreiter, William Thomas; and Mindler, Fredric Alton, to Eastman Kodak Company. Double exposure prevention device. 4,052,730, Cl. 354-135.000.
Hochwald, Walter: *See—*
Kleiner, Charles T.; and Hochwald, Walter, 4,052,657, Cl. 363-43.000.
Hoechst Aktiengesellschaft: *See—*
Christidis, Yani; Mauz, Otto; and Prinz, Eberhard, 4,052,364, Cl. 260-45.85B.
Finke, Manfred; and Kleiner, Hans-Jerg, 4,052,486, Cl. 260-970.000.
Fuchs, Hermann; and Filzinger, Klaus, 4,052,157, Cl. 8-41.00R.
Huber, Bernd; Kleiner, Hans-Jerg; and Neumaier, Hubert, 4,052,551, Cl. 526-278.000.
Klein, Rainer; and Helberg, Jurgen, 4,052,301, Cl. 210-51.000.
Laubert, Gunter; and Ribka, Joachim, 4,052,444, Cl. 260-507.00R.
Martini, Thomas, 4,052,277, Cl. 204-158.00R.
Papenfuhs, Theodor, 4,052,438, Cl. 560-61.000.
Patzner, Alfred, 4,052,163, Cl. 23-259.000.
Pietsch, Hartmut; Clauss, Karl; Jensen, Harald; and Schmidt, Erwin, 4,052,453, Cl. 260-543.00F.
Sahm, Wilfried, 4,052,433, Cl. 260-465.00E.
von der Eltz, Hans-Ulrich; and Lehmann, Joachim Walter, 4,052,156, Cl. 8-22.000.
Hoffman, George John. Apparatus for draining fluid from a continuously evacuated space. 4,051,859, Cl. 137-154.000.
Hoffmann-La Roche, Inc.: *See—*
Hajos, Zoltan George, 4,052,413, Cl. 260-340.9AS.
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, 4,052,446, Cl. 260-514.00D.
Hofmann, Heinrich, to U.S. Philips Corporation. Wire cutter, particularly for cutting electrical connection wires. 4,051,596, Cl. 30-133.000.
Hogan, James A. to Honeywell Inc. Non-linear function generator with switched channels. 4,052,677, Cl. 328-143.000.
Hogan, John Paul. Homohedral module genus extender. 4,051,621, Cl. 46-26.000.
Hoke, William A. Multiple cam, multiple position switch control mechanism with joy-stick type operator operable in x-y planes. 4,052,578, Cl. 200-153.00L.

Holland, George William; Jernow, Jane Liu; and Rosen, Perry, to Hoffmann-La Roche Inc. 11,16-Substituted prostaglandins. 4,052,446, Cl. 260-514.00D.

Hollandsche Beton Groep N.V.: *See*—
Jansz, Joost W., 4,051,685, Cl. 61-53.500.

Hollandse Signaalapparaten B.V.: *See*—
Terwee, Thomas Henricus Marie; and Nijhuis, Jan, 4,051,658, Cl. 57-140.0BY.

Holt, James W.; and Meeks, John K., to Crane Co. Mixing valve. 4,051,869, Cl. 137-636.100.

Holzer, Franz; and Schmolzer, Gerhard, to Vianova Kunstharz, A.G. Process of electrodeposition of coating compositions containing an ammonia complex. 4,052,309, Cl. 204-181.000.

Homanick, George, to PepsiCo Inc. Bulk distribution system. 4,051,969, Cl. 214-516.000.

Honda, Keisuke: *See*—
Shirakawa, Seiichi; Iwahashi, Koji; Nishi, Akio; Honda, Keisuke; and Taoda, Kiyomichi, 4,052,172, Cl. 48-197.00R.

Honeywell Inc.: *See*—
Erdmann, David P.; and Kurschner, Dennis L., 4,052,595, Cl. 235-92.0TC.
Hogan, James A., 4,052,677, Cl. 328-143.000.
Lindsey, Alfred L., 4,052,663, Cl. 324-16.00R.
Peterson, Dean M., 4,052,714, Cl. 346-155.000.

Honikman, Terence C., to Cooper, Allen K., a part interest. Solar energy augmented water heating system. 4,052,000, Cl. 237-1.00A.

Hood, Peter: *See*—
Fechter, Harry Robert; and Hood, Peter, 4,051,714, Cl. 73-40.50A.

Hooker Chemicals & Plastics Corporation: *See*—
Dannels, Bobby F.; and Geering, Emil J., 4,052,281, Cl. 204-159.220.
Dannels, Bobby F., 4,052,283, Cl. 204-159.230.

Hooper, George W.: *See*—
Mojden, Wallace W.; Davila, Jose E.; Hooper, George W.; Kwiatkowski, Gerald M.; and Pantel, Howard W., Jr., 4,051,965, Cl. 214-16.40A.

Hopfner, Clemens; and Ort, Wolfgang, to Eastman Kodak Company. Exposure control apparatus. 4,052,726, Cl. 354-29.000.

Hoppe, Lutz; and Behn, Rudolf, to Wolff Walsrode Aktiengesellschaft. Manufacture and use of water-soluble auxiliary agents based on polyaminoamides for the production of paper. 4,052,259, Cl. 162-164.0EP.

Hori, Haruo: *See*—
Deguchi, Hidetaka; Wada, Hajime; Endo, Takaya; Kikuchi, Shoji; and Hori, Haruo, 4,052,212, Cl. 96-56.200.

Horie, Ikutaro: *See*—
Sera, Hidefumi; Yamamoto, Nobuo; Horie, Ikutaro; Nagao, Kameji; and Iwasaki, Nobuyuki, 4,052,373, Cl. 260-117.000.

Horikoshi, Koki; and Ikeda, Yonosuke, to Rikagaku Kenkyusho. Preparation of an alkaline protease. 4,052,262, Cl. 195-66.00R.

Horn, Robert; and Slovacek, Raymond J., to Forney Engineering Company. Load and radius indicating system. 4,052,602, Cl. 364-424.000.

Hortigro, Inc.: *See*—
Knapp, Philip B.; and Corey, Harold, 4,051,628, Cl. 47-48.500.

Horvath, Gyula: *See*—
Ambrus, Gabor; Barta, Istvan; Mehesfalvi, Zsuzsanna, nee Vajna; and Horvath, Gyula, 4,052,407, Cl. 260-302.00R.

Hosomi, Fumio; Wasa, Kiyotaka; Eayakawa, Shigeru; and Nagai, Takeshi, to Matsushita Electric Industrial Co., Ltd. Stylus for capacitive videodisc. 4,052,738, Cl. 358-128.000.

Hosoya, Nobukazu, to Sanyo Electric Co., Ltd. Phase shifting circuit. 4,052,679, Cl. 330-261.000.

Houck, Stanley J.: *See*—
Appleby, Paul E.; Houck, Stanley J.; and Nash, Richard B., 4,052,237, Cl. 156-117.000.

Hoult, Robert Alan: *See*—
Higham, Peter; and Hoult, Robert Alan, 4,052,661, Cl. 324-.50R.

Hounsfield, Godfrey Newbold, to E M I Limited. Apparatus for examining a body by radiation such as X or gamma radiation. 4,052,618, Cl. 250-360.000.

Hounsfield, Godfrey Newbold, to EMI Limited. Method and apparatus for measuring and analyzing radiation transmitted at plural angles. 4,052,619, Cl. 250-363.00S.

Hover, Louis J.: *See*—
Leistner, William E.; Spiegelman, Gerald H.; and Hover, Louis J., 4,052,427, Cl. 260-429.700.

Howard, Arthur R. Hand protector. 4,051,553, Cl. 2-161.00A.

Howard Machinery Limited: *See*—
Clary, Roger, 4,051,649, Cl. 56-330.000.

Howard, Peter Barry, to Tioxide Group Limited. Treatment of pigment. 4,052,222, Cl. 106-300.000.

Howard, Peter Barry, to Tioxide Group Limited. Treatment of pigment. 4,052,223, Cl. 106-300.000.

Howard, Peter Barry, to Tioxide Group Limited. Treatment of pigment. 4,052,224, Cl. 106-300.000.

Howitt, Robert T., to Frem Corporation. Wall fixture. 4,051,789, Cl. 108-152.000.

Howson-Algraphy Limited: *See*—
Watkinson, Leonard James, 4,052,217, Cl. 96-86.00R.

Hrach, Josef: *See*—
Breitenfellner, Franz; and Hrach, Josef, 4,052,356, Cl. 260-40.00R.

Huang, Jen-Chi: *See*—
Gumbinner, Robert; and Huang, Jen-Chi, 4,052,275, Cl. 204-129.950.

Huber, Bernd; Kleiner, Hans-Jerg; and Neumaier, Hubert, to Hoechst Aktiengesellschaft. Flameproofed modacryl copolymers, fibers and filaments containing carboxy phosphinic acid derivatives having improved thermostability. 4,052,551, Cl. 526-278.000.

Huber-Emden, Helmut, to Ciba-Geigy Corporation. Perfluoro compounds containing phosphorus. 4,052,485, Cl. 260-928.000.

Hucker, David J., to Sundstrand Corporation. Inverter circuit for producing synthesized sinusoidal waveforms. 4,052,658, Cl. 363-43.000.

Hueschen, Robert E.; and Port, John H., to General Electric Company. Anodes for rotary anode x-ray tubes. 4,052,640, Cl. 313-330.000.

Huffman, William A.; Birkeland, Stephen P.; and O'Leary, Kevin P., to Minnesota Mining and Manufacturing Company. Semiconductive and sensitized photoconductive compositions. 4,052,209, Cl. 96-1.50R.

Hug, William F.: *See*—
Wang, Shing Chung; Hamerdinger, Randolph W.; and Hug, William F., 4,052,680, Cl. 331-94.50G.

Hughes, Oscar Richard, to Celanese Corporation. Production of 3-(1',3'-dioxane)-propionaldehyde compounds. 4,052,401, Cl. 260-340.700.

Huignard, Jean-Pierre: *See*—
Spitz, Erich; d'Auria, Luigi; and Huignard, Jean-Pierre, 4,052,706, Cl. 340-173.0LM.

Hultsch, Gunther; Zeppenfeld, Kurt; Niedner, Peter; and Ostermeyer, Peter, to Krauss-Maffei AG. Method of operating a centrifugal filter and a filter centrifuge operating according to this method. 4,052,303, Cl. 210-78.000.

Humbert, Kingsley E., Jr., to Wix Corporation. Universal filter mounting attachment. 4,052,307, Cl. 210-130.000.

Hummeldorf, James L.: *See*—
Bao, Frank W.; Hummeldorf, James L.; and Parker, Stephen D., 4,051,713, Cl. 73-9.000.

Hunter, Travis: *See*—
Hunter, Travis Lowell, 4,052,248, Cl. 156-511.000.

Hunter, Travis Lowell, to Hunter, Travis. Paper dispensing apparatus for rolls of paper. 4,052,248, Cl. 156-511.000.

Hurst, John W., to Chrysler Corporation. Bidirectional drive coupling. 4,051,934, Cl. 192-21.000.

Hurukawa, Toshio: *See*—
Yamazaki, Eiichi; Kanai, Hiromi; and Hurukawa, Toshio, 4,052,643, Cl. 315-16.000.

Huser, Josef Paul, to Utilis Mullheim A.G., Firma. Cutting tool assembly. 4,051,584, Cl. 407-107.000.

Hussain, Anwar: *See*—
Higuchi, Takeru; and Hussain, Anwar, 4,052,505, Cl. 424-14.000.

Hutcheson, William Frank, to Rossville Yarn Processing Company. Process of producing slivers for open-end spinning. 4,051,575, Cl. 19-151.000.

Hutchings, David A.: *See*—
Foley, Howard K.; Hutchings, David A.; and Neubert, Terry C., 4,052,547, Cl. 526-212.000.

Hutchinson, Ronald G., to Simmons Company. Mattress or cushion spring assembly. 4,051,567, Cl. 5-260.000.

Hutson, Thomas, Jr.; and Carter, Cecil O., to Phillips Petroleum Company. Ethylfluoride production. 4,052,469, Cl. 260-653.600.

Hutt, Peter Richard; Blake, Alan Ronald; von Cavallar, Gunter; Douglas, Brian Neil; and Dodds, Philip John, to Independent Broadcasting Authority. Television receiver system having facility for storage and display of character information selected from digitally encoded broadcast transmissions. 4,052,719, Cl. 340-324.0AD.

Hycel, Inc.: *See*—
Vick, Howard Andrew, 4,052,596, Cl. 235-92.0PC.

Hycom Incorporated: *See*—
Turner, Raymond J.; Kameya, Andrew M.; and Salman, Naif D., 4,052,598, Cl. 364-113.000.

I-T-E Imperial Corporation: *See*—
Smith, Robert Kirkland, 4,052,576, Cl. 200-147.00R.
Votta, Gerald A., 4,052,577, Cl. 200-147.00R.

Ide, Fumio; Kishida, Kazuo; and Hasegawa, Akira, to Mitsubishi Rayon Co., Ltd. Vinyl chloride polymer composition. 4,052,482, Cl. 260-876.00R.

Ide, Fumio; Kishida, Kazuo; and Hasegawa, Akira, to Mitsubishi Rayon Co., Ltd. Multi-layer structure acrylic polymer composition. 4,052,525, Cl. 428-412.000.

Igarashi, Toshiro: *See*—
Fukumoto, Ryoichi; and Igarashi, Toshiro, 4,051,632, Cl. 49-348.000.

Ikeda, Yonosuke: *See*—
Horikoshi, Koki; and Ikeda, Yonosuke, 4,052,262, Cl. 195-66.00R.

Iley, James Dixon: *See*—
Ward, Denby Harcourt; and Iley, James Dixon, 4,052,200, Cl. 75-78.000.

Illinois Tool Works Inc.: *See*—
Lindsay, Ernest Harold, Jr.; and Daubert, Richard Francis, Jr., 4,052,315, Cl. 210-232.000.

IMC Chemical Group, Inc.: *See*—
Peters, Charles Allan, 4,052,414, Cl. 260-343.410.

Imperial Chemical Industries Limited: *See*—
Brock, Michael; and Cooke, Brian Alfred, 4,052,232, Cl. 148-6.15Z.
Brooks, John Langshaw; Eaton, David Crawford; and Williams, Barry, 4,052,392, Cl. 544-211.000.
Brown, Michael Trevenen; and Rodway, William George, 4,052,278, Cl. 204-159.200.
Case, John Reginald; and Moore, Geoffrey James, 4,052,405, Cl. 260-294.80R.
Clarke, John Robin Paul, 4,052,162, Cl. 23-253.00R.
Etchells, Sylvia, 4,052,493, Cl. 264-49.000.

Jones, Michael Edward Benet, 4,052,365, Cl. 260-49.000.
Inamori, Katsumi: *See*—
Koyano, Nobushige; and Inamori, Katsumi, 4,052,039, Cl. 266-57.000.
Inariba, Tokuzo. Synchronous micromotor. 4,052,630, Cl. 310-162.000.
Independent Broadcasting Authority: *See*—
Hutt, Peter Richard; Blake, Alan Ronald; von Cavallar, Gunter; Douglas, Brian Neil; and Dodds, Philip John, 4,052,719, Cl. 340-324.0AD.
Industrial Nucleonics Corporation: *See*—
Cho, Boong Youn, 4,052,615, Cl. 250-341.000.
Inoue, Eiichi; Kokado, Hiroshi; Yamaguchi, Takashi; Tokunaga, Yukio; Nakayama, Takao; and Yamase, Toshihiro, to Fuji Photo Film Co., Ltd. Image forming material. 4,052,211, Cl. 96-35.000.
Inoue Gomu Kogyo Kabushiki Kaisha: *See*—
Narita, Koji, 4,052,522, Cl. 428-31.000.
Inoue, Ikutaro: *See*—
Suzuki, Takeo; Inoue, Ikutaro; Tamai, Hideo; and Aoki, Masatsugu, 4,051,942, Cl. 197-49.000.
Inoue-Japax Research Inc.: *See*—
Inoue, Kiyoshi, 4,052,583, Cl. 219-69.00W.
Inoue, Kiyoshi, to Inoue-Japax Research Inc. Method of and apparatus for electrical-discharge machining with a traveling-wire electrode. 4,052,583, Cl. 219-69.00W.
Inoue, Takasuke: *See*—
Itani, Mituo; Kawashima, Hiroyuki; Inoue, Takasuke; and Maruyama, Mikio, 4,051,796, Cl. 114-44.000.
Integral Corporation: *See*—
Bell, Rex R.; and Sandstrom, John W., 4,051,749, Cl. 81-9.510.
Intel Corporation: *See*—
Pashley, Richard D., 4,052,229, Cl. 148-1.500.
Interliz Anstalt: *See*—
Vogt, Alfred, 4,052,001, Cl. 237-1.00A.
International Business Machines Corporation: *See*—
Baca, Joseph Philip; and Marino, Peter Thomas, 4,052,741, Cl. 360-77.000.
Calhoun, Bertram A.; Slonczewski, John C.; and Voegeli, Otto, 4,052,710, Cl. 340-174.0TF.
Cardwell, William Richard; and Queener, Carl Alan, 4,052,054, Cl. 271-227.000.
Chaudhari, Praveen; and Woolhouse, Geoffrey Richard, 4,052,709, Cl. 340-174.0TF.
Franaszek, Peter Anthony, 4,052,704, Cl. 364-900.000.
Heller, Lawrence Griffith; and White, James Merrill, 4,052,606, Cl. 364-825.000.
Karlson, Karl, 4,052,603, Cl. 364-120.000.
Lin, Yeong S.; and Stanland, Jackson E., 4,052,711, Cl. 340-174.0TF.
McGroddy, James Cleary; and Scott, Bruce Albert, 4,052,272, Cl. 204-15.000.
Micka, William Frank; and Robinson, Thomas Scott, 4,052,699, Cl. 340-146.3MA.
International Medical Corporation: *See*—
Hazel, Patrick Michael; and Wells, Roberta Evans, 4,051,842, Cl. 128-2.06E.
International Nickel Company, Inc., The: *See*—
Larson, Floyd Gotthard, Jr.; and deBarbdillo, John Joseph, II, 4,052,203, Cl. 75-130.00B.
International Recreational Industries, Inc.: *See*—
Castoldi, Alex J., Jr., 4,051,993, Cl. 229-22.000.
International Servisport Corporation Ltd.: *See*—
Bengtson, Torsten R.; and Haslbeck, Joseph, 4,051,557, Cl. 2-430.000.
Iost, Michel: *See*—
Michel, Jacques; and Iost, Michel, 4,052,269, Cl. 204-15.000.
Iowa Mold Tooling Co., Inc.: *See*—
Cotton, Larry G., 4,051,966, Cl. 214-332.000.
Iowa State University Research Foundation, Inc.: *See*—
Larock, Richard Craig, 4,052,423, Cl. 260-410.90R.
IPCO Hospital Supply Corporation, Whaledent International Division: *See*—
Schneiderman, Max, 4,051,855, Cl. 128-303.140.
Ippen, Jakob; and Stuttgen, Friedel, to Bayer Aktiengesellschaft. Puncture-proof tires. 4,051,883, Cl. 152-324.000.
Ireland, Henry R.; Peters, Alan W.; and Stein, Thomas R., to Mobil Oil Corporation. Method for upgrading a Fischer-Tropsch light oil. 4,052,477, Cl. 260-676.00R.
Isaacson, Charles E.: *See*—
Dudheker, Jay; and Isaacson, Charles E., 4,052,141, Cl. 431-167.000.
Ishibashi, Takao, to Nihon Beru-Haueru Kabushiki Kaisha. Starting and stopping device for sound motion picture camera. 4,052,125, Cl. 352-29.000.
Ishikawa, Shoichi, to Kabushiki Kaisha Hasegawa Haguruma. Multiple-contact type W-N gear. 4,051,745, Cl. 74-462.000.
Ishikawa, Takehiro, to Kabushiki Kaisha Daini Seikosha. Drive circuit of light emitting means for liquid crystal electronic watch. 4,051,664, Cl. 58-50.00R.
Isobe, Yasuo: *See*—
Ito, Tadashi; Ito, Fumio; Nakamoto, Soichi; and Isobe, Yasuo, 4,052,727, Cl. 354-29.000.
Itagaki, Katsunari, to Sankyo Electric Company Limited. Apparatus for pouring liquid in cups. 4,051,879, Cl. 141-329.000.
Italba, S.p.A.: *See*—
Mosso, Franco Achille, 4,052,300, Cl. 210-20.000.
Itani, Mituo; Kawashima, Hiroyuki; Inoue, Takasuke; and Maruyama, Mikio, to Mitsui Engineering & Shipbuilding Co., Ltd. Method of breaking up ship hull. 4,051,796, Cl. 114-44.000.
Itek Corporation: *See*—
Chang, I-Cheng, 4,052,121, Cl. 350-149.000.
Powers, Robert H., 4,052,731, Cl. 354-275.000.
Ito, Fumio: *See*—
Ito, Tadashi; Ito, Fumio; Nakamoto, Soichi; and Isobe, Yasuo, 4,052,727, Cl. 354-29.000.
Ito, Tadashi; Ito, Fumio; Nakamoto, Soichi; and Isobe, Yasuo, to Canon Kabushiki Kaisha. Exposure control device for a single lens reflex camera. 4,052,727, Cl. 354-29.000.
Itoh, Takuji: *See*—
Nishikawa, Eiichiroh; Itoh, Takuji; Maeshima, Tsugio; and Kamiyama, Setsuo, 4,052,337, Cl. 252-455.00Z.
Iwahashi, Koji: *See*—
Shirakawa, Seiichi; Iwahashi, Koji; Nishi, Akio; Honda, Keisuke; and Taoda, Kiyomichi, 4,052,172, Cl. 48-197.00R.
Iwasaki, Nobuyuki: *See*—
Sera, Hidefumi; Yamamoto, Nobuo; Horie, Ikutaro; Nagao, Kameji; and Iwasaki, Nobuyuki, 4,052,373, Cl. 260-117.000.
Iwatani Sangyo Kabushiki Kaisha: *See*—
Koyano, Nobushige; and Inamori, Katsumi, 4,052,039, Cl. 266-57.000.
Iwatsuki, Frank, to Gould Inc. Flow regulator. 4,051,864, Cl. 137-504.000.
Izumi, Takahisa: *See*—
Mita, Yasuhiro; Yamazaki, Takayuki; and Izumi, Takahisa, 4,052,166, Cl. 23-288.00F.
J. M. Huber Corporation: *See*—
Hackbarth, Lowell E.; Pyle, Sterling W.; and Brandon, Paul W., 4,052,255, Cl. 159-4.00B.
Jack Barnes Engineering, Inc.: *See*—
Barnes, Carl Kenneth; and Barnes, John Owen, 4,051,774, Cl. 101-37.000.
Jacobs, Cornelis Adrianus Joannes, to U.S. Philips Corporation. Electric discharge lamp. 4,052,635, Cl. 313-217.000.
Jacoby, Sidney, to Evergard Fire Alarm Company, Inc. Sensitive fuse for fire alarm. 4,052,690, Cl. 337-405.000.
Jaeger, Walter, to GX-Holding AG. GRGB line sequential color television system. 4,052,734, Cl. 358-12.000.
Jagow, Robert B.: *See*—
United States of America, National Aeronautics and Space Administration; and Jagow, Robert B., 4,052,302, Cl. 210-63.00R.
Jakowicki, Henry. Tile construction for a swimming pool. 4,051,562, Cl. 4-172.000.
Jakubowicz, Raymond F., to Eastman Kodak Company. Telescoping serum separator and dispenser. 4,052,320, Cl. 210-516.000.
James L. Taylor Mfg. Co.: *See*—
Mortoly, John L., 4,052,046, Cl. 269-208.000.
James, Richard N.: *See*—
Barber, John A.; Dion, C. Norman; and James, Richard N., 4,052,750, Cl. 360-135.000.
James, Walter Hugh Knight, to Fluidrive Engineering Company Limited. Drives incorporating variable filling fluid couplings. 4,051,675, Cl. 60-330.000.
Jankowski, Joseph Albin, to Communications Satellite Corporation. Digital voice switch. 4,052,568, Cl. 179-15.0AS.
Jansz, Joost W., to Hollandsche Beton Groep N.V. Positioning method and apparatus for submersible pile driving. 4,051,685, Cl. 61-53.500.
Japanese National Railways: *See*—
Nagase, Kazuhiko; and Takakubo, Michihiko, 4,052,109, Cl. 303-25.000.
Jarund Devello AB: *See*—
Jarund, Harry Sigurd Valdemar, 4,051,950, Cl. 206-306.000.
Jarund, Harry Sigurd Valdemar, to Jarund Devello AB. Hygienic protective shield. 4,051,950, Cl. 206-306.000.
Jean, Bernard Louis Pierre, to U.S. Philips Corporation. Device for manufacturing electron tube having a radiation-sensitive layer. 4,052,115, Cl. 316-31.000.
Jennings, William S., to Clayton Manufacturing Company. High pressure washer. 4,051,814, Cl. 122-448.00R.
Jennmar Corporation: *See*—
Koval, Stephen F., 4,051,683, Cl. 61-45.00B.
Jensen, Harald: *See*—
Pietsch, Hartmut; Clauss, Karl; Jensen, Harald; and Schmidt, Erwin, 4,052,453, Cl. 260-543.00F.
Jensen, Neil John; Nivas, Yogesh; and Packard, Douglas Randall, to General Electric Company. Sintering uranium oxide using a preheating step. 4,052,330, Cl. 252-301.10R.
Jernow, Jane Liu: *See*—
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, 4,052,446, Cl. 260-514.00D.
Jiruse, Jaroslav; and Rozsypal, Josef, to Adamovske strojirny, narodni podnik. Arrangement for driving a rocking initial gripper. 4,052,055, Cl. 271-268.000.
Johansson, Jan-Olof; and Spacek, Karel, to Gullfiber AB. Arrangement for tensioning and guiding the belts of a cellular plastic forming machine. 4,051,742, Cl. 74-241.000.
Johansson, Reinhold A.; and Svensson, Arne B. Machine for dispensing heated sausage from a cold storage compartment. 4,051,772, Cl. 99-427.000.
John Zink Company: *See*—
Reed, Robert D.; and Schwartz, Robert E., 4,052,142, Cl. 431-202.000.

Johnson, Bruce K.: *See—*
Hendry, Donald H.; and Johnson, Bruce K., 4,052,728, Cl. 354-86.000.

Johnson, Charles E., to Buffalo Weaving and Belting Co. Synthetic organic polymeric sling protected by vulcanized or cured elastomeric laminate at load contacting area thereof. 4,052,095, Cl. 294-74.000.

Johnson, James L.; and Brunner, Russell K., to Xerox Corporation. Linear actuator. 4,051,735, Cl. 74-25.000.

Jojima, Teruomi; and Takahi, Yukiyoshi, to Sankyo Company Limited. Agricultural fungicidal compositions containing 6-(substituted phenyl)-pyridazinones and said pyridazinones. 4,052,395, Cl. 424-250.000.

Jones, Gomer W., to Bird Oil Equipment, Ltd. Pump jack. 4,051,736, Cl. 74-41.000.

Jones, Ivor Wynn: *See—*
Robinson, Graham; Brennan, Michael Patrick Joseph; and Jones, Ivor Wynn, 4,052,535, Cl. 429-104.000.

Jones, John B., III. Planters having light-transmitting enclosures. 4,051,631, Cl. 47-69.000.

Jones, John Owen: *See—*
Cocking, Glyn; and Jones, John Owen, 4,051,865, Cl. 137-556.000.

Jones, Lawrence T.; and Sims, Anson, to California R & D Center. Articulated handle wheeled vehicle. 4,052,082, Cl. 280-87.02R.

Jones, Michael Edward Benet, to Imperial Chemical Industries Limited. Manufacture of crystallizable polymeric phenylene ether sulphone ketones. 4,052,365, Cl. 260-49.000.

Jonsson, Erik Alfon, to Boliden Aktiebolag. Arrangement in mill drums provided with wear protective linings. 4,052,014, Cl. 241-183.000.

Joslyn Mfg. and Supply Co.: *See—*
Cunningham, Francis V., 4,052,639, Cl. 313-325.000.

Jossel, Franklin: *See—*
Mammino, Joseph; and Jossel, Franklin, 4,052,207, Cl. 96-1.200.

Joy Manufacturing Company: *See—*
Bailey, Edward A., 4,052,047, Cl. 269-238.000.

Jung, Hans-Wolf: *See—*
Wehner, Wolfgang; Maul, Rudolf; and Jung, Hans-Wolf, 4,052,426, Cl. 260-429.700.

Junge, Helmut; and Kurtz, Walter, to BASF Aktiengesellschaft. Azo pigment or dye having a naphthyl-quinazalone coupling component. 4,052,371, Cl. 260-154.000.

Junge, Helmut; and Kurtz, Walter, to BASF Aktiengesellschaft. Monoazo dye having a β-hydroxynaphthoic acid amide coupling component. 4,052,377, Cl. 260-154.000.

K-D Manufacturing Company: *See—*
Ramsey, Keith E., 4,051,970, Cl. 214-670.000.

Kabushiki Kaisha Daini Seikosha: *See—*
Ishikawa, Takehiro, 4,051,664, Cl. 58-50.00R.

Kabushiki Kaisha Hasegawa Haguruma: *See—*
Ishikawa, Shoichi, 4,051,745, Cl. 74-462.000.

Kabushiki Kaisha Sato Kenkyusho: *See—*
Sato, Yo, 4,051,780, Cl. 101-305.000.

Kabushiki Kaisha Seikosha: *See—*
Oshima, Kenji, 4,051,744, Cl. 74-437.000.

Kabushiki Kaisha Suwa Seikosha: *See—*
Chihara, Hiroyuki; and Numabe, Hitomi, 4,051,663, Cl. 58-26.00R.
Yoshino, Masahito; and Kawasumi, Kazuo, 4,051,666, Cl. 58-85.500.

Kabushiki Kaisha Taishin Seisakusho: *See—*
Sasahara, Yoshio, 4,051,709, Cl. 72-356.000.

Kaffka, Dietmar, to Lindemann Maschinenfabrik GmbH. Apparatus for changing containers at an ejection opening of a refuse press. 4,051,955, Cl. 214-1.0BB.

Kahn, Donald D.: *See—*
Pastor, Sheldon Lee; Erickson, Milton E.; and Kahn, Donald D., 4,052,742, Cl. 360-96.000.

Kaiser, Carl; Pendleton, Robert G.; and Setler, Paulette E., to Smith-Kline Corporation. Pharmaceutical compositions and method of producing anti-Parkinsonism activity. 4,052,506, Cl. 424-244.000.

Kaiser Gypsum Company, Inc.: *See—*
Kontny, Merle E.; and Morris, Dorsey J., 4,052,492, Cl. 264-6.000.

Kalaus, Gyorgy: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,052,404, Cl. 260-293.530.

Kallman, Robert A. Accessory holder for use on article of clothing. 4,051,554, Cl. 2-94.000.

Kalvoda, Jaroslav: *See—*
Biollaz, Michel; and Kalvoda, Jaroslav, 4,052,421, Cl. 260-397.500.

Kamaike, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Elevator speed control system. 4,052,651, Cl. 318-230.000.

Kamenev, Alexandr Fedorovich: *See—*
Baburin, Sergei Vyacheslavovich; Akimov, Vasily Ivanovich; Gorbushin, Vladimir Alexandrovich; Muraviev, Alexandr Petrovich; Nepein, Valery Nikolaevich; Frolov, Mikhail Vladimirovich; Aizenberg, Sergei Arnoldovich; Golovko, Evgeny Mikhailovich; Kamenev, Alexandr Fedorovich; and Sergeev, Igor Alexandrovich, 4,051,576, Cl. 19-156.000.

Kameya, Andrew M.: *See—*
Turner, Raymond J.; Kameya, Andrew M.; and Salman, Naif D., 4,052,598, Cl. 364-113.000.

Kaminaka, Nobuyuki: *See—*
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, 4,052,749, Cl. 360-123.000.

Kamiyama, Setsuo: *See—*
Nishikawa, Eiichiroh; Itoh, Takuji; Maeshima, Tsugio; and Kamiyama, Setsuo, 4,052,337, Cl. 252-455.00Z.

Kamo, Takashi: *See—*
Wada, Moriyasu; Kumagai, Katuya; and Kamo, Takashi, 4,052,358, Cl. 260-40.00R.

Kanagawa, Shuichi; Tanimura, Shozo; and Sagawa, Seiji, to Sumitomo Chemical Company, Limited. Method of protection from ozone deterioration for rubber. 4,052,363, Cl. 260-45.9KA.

Kanai, Hiromi: *See—*
Yamazaki, Eiichi; Kanai, Hiromi; and Hurukawa, Toshio, 4,052,643, Cl. 315-16.000.

Kanai, Kenji: *See—*
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, 4,052,749, Cl. 360-123.000.

Kane, Richard E.; Reese, Frank L., deceased; and by Reese, Blanche C., executrix, to Westinghouse Electric Corporation. Metal-clad gas-type high-power circuit-breaker constructions involving two arc-extinguishing assemblages. 4,052,575, Cl. 200-145.000.

Kanebo, Limited: *See—*
Hirano, Satoru; Kubota, Atsushi; Yoshida, Mitsuru; Mizuno, Junzi; and Miyamoto, Nobutaka, 4,051,652, Cl. 57-52.000.

Kantrowitz, Adrian; and Freed, Paul S., to Sinai Hospital of Detroit. Dynamic aortic patch. 4,051,840, Cl. 128-1.00D.

Kapasi, Vikram C.; Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, to Pandel-Bradford, Inc. Method of preparing imitation sheet material. 4,052,236, Cl. 156-85.000.

Kaplan, Carl, to Plough, Inc. Stable topical anesthetic compositions. 4,052,513, Cl. 424-310.000.

Kaplan, Ronald M.: *See—*
Beane, David J.; and Kaplan, Ronald M., 4,051,708, Cl. 72-354.000.

Karasudani, Yasuo, to Tokico Ltd. Disc brake. 4,051,926, Cl. 188-73.300.

Karasudani, Yasuo, to Tokico Ltd. Disc brake. 4,051,927, Cl. 188-73.300.

Karlson, Karl, to International Business Machines Corporation. Object positioning process and apparatus. 4,052,603, Cl. 364-120.000.

Karpati, Egon: *See—*
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,052,404, Cl. 260-293.530.

Karpinsky, William J., to Container Corporation of America. Apparatus for heat sealing of container bodies. 4,052,154, Cl. 432-222.000.

Kast, Helimut; and Dunkelmann, Guenter, to BASF Aktiengesellschaft. Diazarhodamine-lactones, their manufacture and their use as dye intermediates for copying processes. 4,052,398, Cl. 260-256.40F.

Kasubuchi, Takeshi: *See—*
Fujimoto, Isao; Kasubuchi, Takeshi; Aiba, Masahiko; and Shimazawa, Yoichi, 4,051,945, Cl. 197-176.000.

Katagi, Takashi: *See—*
Takeichi, Yoshihiro; Hashimoto, Tsutomu; Takeda, Fumio; and Katagi, Takashi, 4,052,724, Cl. 343-786.000.

Kato, Kaoru: *See—*
Yamada, Tatsunori; Mori, Shigeru; Kato, Kaoru; Arai, Yasuyuki; and Sakitani, Katumi, 4,051,888, Cl. 165-1.000.

Kato, Nobuyuki: *See—*
Sakamoto, Yoichi; Kato, Nobuyuki; and Ohtani, Tadao, 4,051,706, Cl. 72-253.00R.

Kato, Shiro; and Hattori, Yasuhiro, to Toyoda-Koki Kabushiki-Kaisha. Machine tool with a turret head for tool spindles. 4,051,583, Cl. 29-40.000.

Kawai, Hiroyuki: *See—*
Ohgida, Hidetoshi; Sakai, Yoshiharu; and Kawai, Hiroyuki, 4,051,975, Cl. 220-203.000.

Kawai, Yoshio: *See—*
Kojima, Tatsuo; and Kawai, Yoshio, 4,052,573, Cl. 200-11.0DA.

Kawasaki Heavy Industries, Ltd.: *See—*
Takagi, Izumi; and Yanagiuchi, Noboru, 4,051,739, Cl. 74-230.17E.

Kawashima, Hiroyuki: *See—*
Itani, Mituo; Kawashima, Hiroyuki; Inoue, Takasuke; and Maruyama, Mikio, 4,051,796, Cl. 114-44.000.

Kawasumi, Kazuo: *See—*
Yoshino, Masahito; and Kawasumi, Kazuo, 4,051,666, Cl. 58-85.500.

Kay, Edward Leo: *See—*
Crane, Grant; and Kay, Edward Leo, 4,052,344, Cl. 260-2.300.

Kehl, William L.; and Lynch, Thomas J., to Gulf Oil Corporation. Ethylene polymerization catalysts. 4,052,544, Cl. 526-102.000.

Keller, Hansjurg, to Cerberus AG. Infrared radiation-burglary detector. 4,052,616, Cl. 250-353.000.

Kemp, Klaus M. Process for the pyrolytic treatment of organic, pseudo-organic and inorganic material. 4,052,265, Cl. 201-2.500.

Kendall Company, The: *See—*
Collins, Robert F., 4,051,845, Cl. 128-132.00D:
Davenport, Stanley; and Villari, Frank K., 4,051,556, Cl. 2-421.000.
Villari, Frank K., 4,051,852, Cl. 128-278.000.

Kendall, Willard E.: *See—*
Frankel, Donald P.; Kendall, Willard E.; and Cooper, John F., 4,051,561, Cl. 4-131.000.

Kennoy, John T. Basketball game. 4,052,064, Cl. 273-85.00R.

Kenny, Shaun S.; and Armstrong, Leonard J., to Conservocon, Inc. Remotely-controlled valve. 4,052,035, Cl. 251-14.000.

Kenway Incorporated: *See—*
Smith, Kay D.; Bachass, Arjun S.; and Black, Francis B., 4,052,702, Cl. 364-200.000.

Kern, Hobart Malcolm, Jr., to Struthers Scientific and International Corporation. Fluidized bed apparatus. 4,051,603, Cl. 34-57.00A.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Forster, Siegfried; Dibelius, Gunter; Hewing, Gunter; and Singh, Jasbir, 4,052,260, Cl. 176-60.000.
Kewaco AB: *See*—
Wallberg, Karl Erik, 4,052,096, Cl. 294-88.000.
Kide, Leif, to Nea-Lindberg A/S. Electrostatic precipitator arrangements. 4,052,177, Cl. 55-139.000.
Kiefer, Josef, to Sielafff GmbH & Co. Automatenbau Herrieden. Merchandise compartmenting arrangement for an automatic vending machine. 4,051,978, Cl. 221-197.000.
Kiewert, Harold J.: *See*—
Lott, George T.; and Kiewert, Harold J., 4,052,175, Cl. 51-96.000.
Kikuchi, Shoji: *See*—
Deguchi, Hidetaka; Wada, Hajime; Endo, Takaya; Kikuchi, Shoji; and Hori, Haruo, 4,052,212, Cl. 96-56.200.
Kikuchi, Yasushi: *See*—
Miyata, Junjiro; and Kikuchi, Yasushi, 4,051,771, Cl. 99-276.000.
Kimball, Stephen F.; and Gates, Paul E., to GTE Sylvania Incorporated. Circuit breaker with parallel shorting element. 4,052,687, Cl. 337-25.000.
Kimura, Senkichiro. Method for the manufacture of an ornamental head lug of the single unit type for use in bicycles. 4,051,704, Cl. 72-58.000.
Kimura, Tsuguo: *See*—
Kuroishi, Shoji; Kimura, Tsuguo; Emoto, Masami; and Yamamoto, Shiro, 4,052,127, Cl. 355-3.0DD.
Kindig, Alan L., to General Electric Company. Methods and apparatus for use in making electrical interconnections. 4,051,594, Cl. 29-596.000.
King, Charles, to Flow Ezy Filters, Inc. Strainer magnets. 4,052,312, Cl. 210-223.000.
Kingelin, George F., to Gulf Research & Development Company. Well testing tool. 4,051,897, Cl. 166-125.000.
Kingzett, Thomas J., to Motorola, Inc. Semiconductor-oxide etchant. 4,052,253, Cl. 156-657.000.
Kirk, Norbert A. Portable, pocket size ash tray. 4,052,179, Cl. 55-385.00G.
Kishida, Kazuo: *See*—
Ide, Fumio; Kishida, Kazuo; and Hasegawa, Akira, 4,052,482, Cl. 260-876.00R.
Ide, Fumio; Kishida, Kazuo; and Hasegawa, Akira, 4,052,525, Cl. 428-412.000.
Kittag, Gerd: *See*—
Freudenschuss, Otto; and Kittag, Gerd, 4,052,126, Cl. 352-84.000.
Klauke, Erich: *See*—
Bein, Hans-Samuel; and Klauke, Erich, 4,052,386, Cl. 260-242.200.
Klein, Alfons: *See*—
Sobel, Johannes; Klein, Alfons; Nittel, Fritz; and Wedemeyer, Karlfried, 4,052,216, Cl. 96-84.0UV.
Klein, Joseph F. M.; Stijfs, Petrus A. M. J.; and Thoma, Jozef A., to Stamicarbon B.V. Process for preparing 2-(1-cyclohexenyl)-cyclohexanone. 4,052,458, Cl. 260-586.00C.
Klein, Rainer; and Helberg, Jurgen, to Hoechst Aktiengesellschaft. Process for purifying waste water. 4,052,301, Cl. 210-51.000.
Kleine, Werner Kurt M., to Gerbruder Heller. Drill for percussion drilling machines. 4,051,905, Cl. 173-104.000.
Kleiner, Charles T.; and Hochwald, Walter, to Rockwell International Corporation. Distribution system for A. C. electrical energy derived from D. C. energy sources. 4,052,657, Cl. 363-43.000.
Kleiner, Hans-Jerg: *See*—
Finke, Manfred; and Kleiner, Hans-Jerg, 4,052,486, Cl. 260-970.000.
Huber, Bernd; Kleiner, Hans-Jerg; and Neumaier, Hubert, 4,052,551, Cl. 526-278.000.
Klesper, Hugo: *See*—
Busse, Oswald; and Klesper, Hugo, 4,052,314, Cl. 210-230.000.
Klingler, Thomas C.: *See*—
Goralski, Christian T.; Klingler, Thomas C.; and Wolf, Paul A., 4,052,258, Cl. 162-161.000.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Suprunov, Vladimir; Kryczun, Alfred; and Manshausen, Theodor, 4,051,602, Cl. 34-10.000.
Knapp, Philip B.; and Corey, Harold, to Hortigro, Inc. Apparatus for the improved dispensing of plant nutriments. 4,051,628, Cl. 47-48.500.
Knight, Peter Charles, to Girling Limited. Disc brakes for vehicles including a screw-threaded draw bar assembly. 4,051,925, Cl. 188-72.400.
Knox, Jon A. Computer tape reel. 4,052,020, Cl. 242-71.800.
Knuppel, Helmut: *See*—
Brotzmann, Karl; Knuppel, Helmut; Rheinlander, Paul; and Mahn, Gustav, 4,052,197, Cl. 75-60.000.
Koashi, Katsue: *See*—
Miyake, Takao; Koashi, Katsue; and Sawada, Masato, 4,052,018, Cl. 242-36.000.
Kobayashi, Yasuhiro, to Yoshida Kogyo K.K. Pull tab attachment tool. 4,051,710, Cl. 72-410.000.
Kohara, Minoru: *See*—
Shiohara, Tomoo; Kohara, Minoru; and Miyoshi, Hiroshi, 4,052,350, Cl. 260-23.0XA.
Kohler General, Inc.: *See*—
Pietzner, Jurgen R., 4,052,137, Cl. 425-577.000.
Koike, Yujiro: *See*—
Wada, Masanobu; Koike, Yujiro; and Okuma, Yoshihisa, 4,052,739, Cl. 358-299.000.
Kojima, Tatsuo; and Kawai, Yoshio, to Murata Manufacturing Co., Ltd. Rotary or slide type switch assembly having recessed printed circuit substrate, interposed resilient bridging contact and movable printed circuit disc. 4,052,573, Cl. 200-11.0DA.
Kokado, Hiroshi: *See*—
Inoue, Eiichi; Kokado, Hiroshi; Yamaguchi, Takashi; Tokunaga, Yukio; Nakayama, Takao; and Yamase, Toshihiro, 4,052,211, Cl. 96-35.000.
Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Watanabe, Tatsuo; Saito, Hideki; Ogawa, Akira; and Yamaguchi, Masahisa, deceased, 4,052,670, Cl. 325-4.000.
Kolakowski, Anthony, to PPG Industries, Inc. Method and apparatus for press bending glass sheets having rabbeted edges. 4,052,185, Cl. 65-106.000.
Kolator, Tadeusz W., to Westinghouse Canada Limited. Current transformer. 4,052,685, Cl. 336-60.000.
Komarov, Jury Ivanovich; Lukhmanov, Viktor Mikhailovich; and Kovalev, Gennady Ivanovich. Travelling-wave loom. 4,051,872, Cl. 139-436.000.
Konig, Wolfgang, to Compur-Electronic Gesellschaft mit beschrankter Haftung. Apparatus for centrifugal separation and measurement of samples. 4,052,164, Cl. 23-259.000.
Konishiroku Photo Industry Co., Ltd.: *See*—
Deguchi, Hidetaka; Wada, Hajime; Endo, Takaya; Kikuchi, Shoji; and Hori, Haruo, 4,052,212, Cl. 96-56.200.
Kontny, Merle E.; and Morris, Dorsey J., to Kaiser Gypsum Company, Inc. Method for producing preformed expansion joint fillers. 4,052,492, Cl. 264-6.000.
Koppelman, Edward. Process for upgrading lignitic-type coal as a fuel. 4,052,168, Cl. 44-1.00G.
Kori, Seiji: *See*—
Hayashi, Masaki; Kori, Seiji; and Wakatsuka, Hirohisa, 4,052,512, Cl. 424-305.000.
Korn, Volker: *See*—
Franetzki, Manfred; Korn, Volker; and Prestele, Karl, 4,051,843, Cl. 128-2.080.
Kotsuka, Tadashi; and Ohchi, Torao, to Tokyo Juki Kogyo Kabushiki Kaisha. Cloth guide mechanism in a sewing machine. 4,051,795, Cl. 112-153.000.
Koval, Stephen F., to Jennmar Corporation. Method and apparatus for supporting a mine roof. 4,051,683, Cl. 61-45.00B.
Kovalev, Gennady Ivanovich: *See*—
Komarov, Jury Ivanovich; Lukhmanov, Viktor Mikhailovich; and Kovalev, Gennady Ivanovich, 4,051,872, Cl. 139-436.000.
Kowalski, Frank V.: *See*—
Schawlow, Arthur L.; and Kowalski, Frank V., 4,052,129, Cl. 356-106.00R.
Koyama, Yasuto: *See*—
Nagakura, Akira; Moroe, Michio; Koyama, Yasuto; and Kurihara, Haruki, 4,052,457, Cl. 260-586.00G.
Koyano, Nobushige; and Inamori, Katsumi, to Iwatani Sangyo Kabushiki Kaisha; and Seimitsu Yodanki Kabushiki Kaisha. Automatic cutting torch assembly. 4,052,039, Cl. 266-57.000.
Krabetz, Richard; Engelbach, Heinz; Lebert, Ulrich; Frey, Walter; Duembgen, Gerd; Thiessen, Fritz; and Willersinn, Carl-Heinz, to BASF Aktiengesellschaft. Catalytic oxidation of α-olefins. 4,052,450, Cl. 260-533.00N.
Kraft, Inc.: *See*—
Leonard, Edward C., 4,052,425, Cl. 260-413.000.
Valek, John; Miller, Roland E.; and Scaletta, Joseph A., 4,051,707, Cl. 72-348.000.
Kraftwerk Union Aktiengesellschaft: *See*—
Kuter, Heinrich; and Krieger, Gerhard, 4,052,629, Cl. 310-68.00D.
Kuter, Heinrich, 4,052,631, Cl. 310-68.00D.
Kragen, Horst, to Ceca S.A. Agar-base gelling products. 4,052,264, Cl. 195-100.000.
Kramer, Manuel; and Dapprich, Douglas J., to Charles Stark Draper Laboratory, Inc., The. Gyro stabilized inertial reference system with gimbal lock prevention means. 4,052,654, Cl. 318-649.000.
Kratzer, Hans: *See*—
Dickore, Karlfried; Engels, Hans Dieter; Kratzer, Hans; and Merz, Walter, 4,052,460, Cl. 260-593.00H.
Krauss-Maffei AG: *See*—
Hultsch, Gunther; Zeppenfeld, Kurt; Niedner, Peter; and Ostermeyer, Peter, 4,052,303, Cl. 210-78.000.
Kreahling, Robert P.; Casey, Donald J.; and Goldenberg, David Z., to American Cyanamid Company. Drawing isocyanate-treated polyester filaments. 4,052,500, Cl. 264-290.00T.
Kreahling, Robert P.; Casey, Donald J.; and Goldenberg, David Z., to American Cyanamid Company. Treatment of polyester filaments with aromatic isocyanate mixture. 4,052,501, Cl. 264-290.00T.
Krebs, Bonnie E. Mesh coffee filter. 4,052,318, Cl. 210-337.000.
Krenzer, John, to Velsicol Chemical Corporation. 1-Thiadiazolyl-5-alkyl- and arylaminoimidazolidinones. 4,052,191, Cl. 71-90.000.
Krenzer, John, to Velsicol Chemical Corporation. 1-(5-t-Butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-nonanoyloxy-1,3-imidazolidin-2-one herbicide. 4,052,192, Cl. 71-90.000.
Krenzer, John, to Velsicol Chemical Corporation. 1-(5-t-butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-octanoyloxy-1,3-imidazolidin-2-one herbicide. 4,052,193, Cl. 71-90.000.
Krieger, Gerhard: *See*—
Kuter, Heinrich; and Krieger, Gerhard, 4,052,629, Cl. 310-68.00D.
Kryczun, Alfred: *See*—
Suprunov, Vladimir; Kryczun, Alfred; and Manshausen, Theodor, 4,051,602, Cl. 34-10.000.
Ku, Irene Lau: *See*—
Ku, Paul; and Ku, Irene Lau, 4,051,692, Cl. 62-244.000.

Ku, Paul; and Ku, Irene Lau. Cooling apparatus for automobile passenger compartment. 4,051,692, Cl. 62-244.000.

Kubota, Atsushi: *See—*
Hirano, Satoru; Kubota, Atsushi; Yoshida, Mitsuru; Mizuno, Junzi; and Miyamoto, Nobutaka, 4,051,652, Cl. 57-52.000.

Kubushiro, Kanemitsu, to Mitsubishi Petrochemical Co., Ltd. Photocurable flexible orthopedic bandage. 4,052,282, Cl. 204-159.230.

Kuelzer, Peter, to Siemens Aktiengesellschaft. Mosaic needle printer head using plunger armature solenoid arrangements. 4,051,940, Cl. 197-1.00R.

Kugler, Tibor: *See—*
Borer, Werner J.; Kugler, Tibor; Schmidt, Walter; and Stahlin, Walter, 4,052,153, Cl. 432-156.000.

Kuijk, Karel Elbert, to U.S. Philips Corporation. Magnetoresistive magnetic head. 4,052,748, Cl. 360-113.000.

Kukolja, Stjepan, to Eli Lilly and Company. Method of preparation of 3-methylenecephams. 4,052,387, Cl. 544-22.000.

Kumagai, Katuya: *See—*
Wada, Moriyasu; Kumagai, Katuya; and Kamo, Takashi, 4,052,358, Cl. 260-40.00R.

Kuraray Co., Ltd.: *See—*
Tamura, Masuhiko; and Yasui, Teruo, 4,052,442, Cl. 560-243.000.

Kurashiki Boseki Kabushiki Kaisha: *See—*
Miyake, Takao; Koashi, Katsue; and Sawada, Masato, 4,052,018, Cl. 242-36.000.

Kurihara, Haruki: *See—*
Nagakura, Akira; Moroe, Michio; Koyama, Yasuto; and Kurihara, Haruki, 4,052,457, Cl. 260-586.00G.

Kurita, Masayuki: *See—*
Yoshikawa, Toshio; Sakamoto, Nagayoshi; Kurita, Masayuki; Oh-e, Shunji; and Nagamori, Tomitada, 4,052,362, Cl. 260-45.9NC.

Kuroishi, Shoji; Kimura, Tsuguo; Emoto, Masami; and Yamamoto, Shiro, to Ricoh Co., Ltd. Developing system. 4,052,127, Cl. 355-3.0DD.

Kurschner, Dennis L.: *See—*
Erdmann, David P.; and Kurschner, Dennis L., 4,052,595, Cl. 235-92.0TC.

Kurtz, Walter: *See—*
Junge, Helmut; and Kurtz, Walter, 4,052,371, Cl. 260-154.000.
Junge, Helmut; and Kurtz, Walter, 4,052,377, Cl. 260-154.000.

Kuter, Heinrich; and Krieger, Gerhard, to Kraftwerk Union Aktiengesellschaft. Rotating rectifier assembly. 4,052,629, Cl. 310-68.00D.

Kuter, Heinrich, to Kraftwerk Union Aktiengesellschaft. Rotary rectifier device for electric machines. 4,052,631, Cl. 310-68.00D.

Kuts, Mathew, to B. F. Goodrich Company, The. Centering device. 4,052,245, Cl. 156-405.00R.

Kutsukake, Yukinori: *See—*
Nagano, Kentaro; Nomaki, Koji; Kutsukake, Yukinori; and Nanao, Junji, 4,052,691, Cl. 338-35.000.

Kwiatkowski, Gerald M.: *See—*
Mojden, Wallace W.; Davila, Jose E.; Hooper, George W.; Kwiatkowski, Gerald M.; and Pantel, Howard W., Jr., 4,051,965, Cl. 214-16.40A.

Labatt Breweries of Canada Limited: *See—*
Richardson, Bruce E.; Wilson, Gerald E.; Leseelleur, Louis A.; and Oetliker, Rudy, 4,051,958, Cl. 214-8.50C.

Laboratoires de Physicochimie Appliquee I S S E C: *See—*
Samat, Andre; Guglielmetti, Robert; and Metzger, Jacques, 4,052,218, Cl. 96-114.100.

Lagaholm AB: *See—*
Staff, Finn; and Svensson, Christer, 4,051,959, Cl. 214-38.0BA.

Lagunilla-Leca, Carlos. Double-walled cover for cooking food. 4,051,836, Cl. 126-275.00R.

Laitram Corporation, The: *See—*
Lapeyre, James M., 4,051,949, Cl. 198-853.000.

Lake Geneva A & C Corporation: *See—*
Frankel, Donald P.; Kendall, Willard E.; and Cooper, John F., 4,051,561, Cl. 4-131.000.

Lamy, Jacques Edouard Jean, to C. G. Doris. Platforms resting upon the bed of a body of water. 4,051,686, Cl. 61-86.000.

Landreth, Thomas C.: *See—*
Sanders, Harold D.; and Landreth, Thomas C., 4,052,116, Cl. 339-8.00R.

Landsberg, Dieter. Actuator for fluid pressure-operated power devices. 4,051,767, Cl. 91-420.000.

Lang, William H.: *See—*
Chang, Clarence D.; Lang, William H.; and Silvestri, Anthony J., 4,052,479, Cl. 260-682.000.

Lange, Gerhard, to Wafios, Maschinenfabrik, Wagner, Ficker & Schmid (GmbH & Co. KG). Chain welding machine. 4,051,667, Cl. 59-31.000.

Lange, Julius, to Ford Motor Company. Adaptive equalizer. 4,052,671, Cl. 325-42.000.

Langen Company: *See—*
Strauff, Gunter, 4,051,766, Cl. 91-417.00R.
Strauff, Gunther, 4,052,233, Cl. 148-12.100.

Lapeyre, James M., to Laitram Corporation, The. Conveyor system. 4,051,949, Cl. 198-853.000.

Lapin, Evgeny Mikhailovich: *See—*
Sidyakin, Vitaly Alexandrovich; Sabantsev, Alexandr Nikolaevich; Lapin, Evgeny Mikhailovich; and Machnev, Evgeny Alexeevich, 4,052,585, Cl. 219-100.000.

Large, Bryan John: *See—*
Broughton, Barbara Joyce; Large, Bryan John; Marshall, Stuart Malcolm; Pain, David Lord; and Wooldridge, Kenneth Robert Harry, 4,052,390, Cl. 544-118.000.

Larkin, Kenneth A., to E. & J. Gallo Winery. Analog-to-digital encoder unit employing a pre-encoded film with improved film tensioning means. 4,052,612, Cl. 250-237.00R.

Larock, Richard Craig, to Iowa State University Research Foundation, Inc. Synthesis of α,β-unsaturated carboxylic acids and esters. 4,052,423, Cl. 260-410.90R.

Lars Collin Consult AB: *See—*
Collin, Lars Thorbjorn, 4,051,679, Cl. 60-656.000.

Larson, Floyd Gotthard, Jr.; and deBarbdillo, John Joseph, II, to International Nickel Company, Inc., The. Crushable low reactivity nickel-base magnesium additive. 4,052,203, Cl. 75-130.00B.

Larson, Raymond George. Versatile light diffuser. 4,052,607, Cl. 362-18.000.

Larson, Wayne K., to Minnesota Mining and Manufacturing Company. Water-dispellable hot melt polyester adhesives. 4,052,368, Cl. 260-75.00S.

Lash, Ronald J.: *See—*
Harbulak, Edward P.; and Lash, Ronald J., 4,052,254, Cl. 156-664.000.

Lasman, Henry R.: *See—*
Kapasi, Vikram C.; Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,052,236, Cl. 156-85.000.

Lassig, Wolfgang: *See—*
Credner, Hans Heinrich; Lassig, Wolfgang; Meier, Ernst; Ranz, Erwin; Schleger, Siegfried; and Schranz, Karl-Wilhelm, 4,052,213, Cl. 96-66.300.

Laubert, Gunter; and Ribka, Joachim, to Hoechst Aktiengesellschaft. N-(aminobenzoyl)-aminoarylsulfonic acids. 4,052,444, Cl. 260-507.00R.

Lavell, Maurice; and Wilson, Donald P. Battery charging system. 4,052,656, Cl. 320-23.000.

Lawrence Peska Assoc., Inc.: *See—*
Balkcom, Robby P., 4,052,060, Cl. 273-73.00R.
Steinfeld, Carolyn VeAlletto, 4,051,977, Cl. 221-96.000.

Lear Motors Corporation: *See—*
Greenwell, Jack E.; and Prokop, Alexander, 4,052,649, Cl. 318-212.000.

Lear Siegler, Inc.: *See—*
Dudheker, Jay; and Isaacson, Charles E., 4,052,141, Cl. 431-167.000.

Learn, Richard D., to Duchess Mfg. Corporation. Link chain. 4,051,668, Cl. 59-80.000.

Lebenson, Robert J.: *See—*
Kapasi, Vikram C.; Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,052,236, Cl. 156-85.000.

Lebert, Ulrich: *See—*
Krabetz, Richard; Engelbach, Heinz; Lebert, Ulrich; Frey, Walter; Duembgen, Gerd; Thiessen, Fritz; and Willersinn, Carl-Heinz, 4,052,450, Cl. 260-533.00N.

Lecolier, Serge L.: *See—*
Sturtz, Georges L.; Lecolier, Serge L.; Clement, Jean-Claude; and Biehler, Jean Marie, 4,052,487, Cl. 260-945.000.

Ledeen Flow Control Systems: *See—*
Ledeen, Howard L.; and Schmon, Franz, 4,051,715, Cl. 73-40.50R.

Ledeen Flow Control Systems, Inc.: *See—*
Ledeen, Howard L.; Schmon, Franz; and Tupker, Willem E., 4,051,676, Cl. 60-404.000.

Ledeen, Howard L.; Schmon, Franz; and Tupker, Willem E., to Ledeen Flow Control Systems, Inc. Hydraulic valve actuator. 4,051,676, Cl. 60-404.000.

Ledeen, Howard L.; and Schmon, Franz, to Ledeen Flow Control Systems. Linebreak detection system. 4,051,715, Cl. 73-40.50R.

Lee, Emerson H., to Monsanto Company. Catalyst treatment. 4,052,333, Cl. 252-416.000.

Lee-Mason Tools Ltd.: *See—*
Mason, Leonard; and Anderson, Clifford, 4,051,696, Cl. 64-23.000.

Leeds & Northrup Company: *See—*
Wertheimer, Alan L., 4,052,600, Cl. 364-554.000.

Lefevre, Marcel Robert, to Research-Cottrell, Inc. Modular gas and liquid contact means. 4,052,491, Cl. 261-112.000.

Lehman, Maurice E. Wheelbarrow transport means. 4,052,079, Cl. 280-47.200.

Lehmann, Joachim Walter: *See—*
von der Eltz, Hans-Ulrich; and Lehmann, Joachim Walter, 4,052,156, Cl. 8-22.000.

Leistner, William E.; Spiegelman, Gerald H.; and Hover, Louis J., to Witco Chemical Corporation. Process for the preparation of dialkyltin dihalides. 4,052,427, Cl. 260-429.700.

Lekberg, Robert D. Preparation of calcium pantothenate. 4,052,451, Cl. 260-534.00A.

Leland Stanford Junior University, Board of Trustees of: *See—*
Schawlow, Arthur L.; and Kowalski, Frank V., 4,052,129, Cl. 356-106.00R.

Leonard, Edward C., to Kraft, Inc. Fatty acid feed stock blend of red oil and soap stock for the preparation of dimer fatty acids. 4,052,425, Cl. 260-413.000.

Leonhardt, Herbert. Guide bar assembly for a warp knitting machine. 4,051,698, Cl. 66-205.000.

Leprohon, Louis C., Jr.; and Overdurf, John C., Jr., to Bethlehem Steel Corporation. Wire strand and rope. 4,051,661, Cl. 57-148.000.

Lerner, Robert Wendell; Towers, Russell S.; and Flasch, John Robert,

to Stauffer Chemical Company. Stable aluminum alkoxide solutions. 4,052,428, Cl. 260-448.0AD.

Leseelleur, Louis A.: *See*—
Richardson, Bruce E.; Wilson, Gerald E.; Leseelleur, Louis A.; and Oetliker, Rudy, 4,051,958, Cl. 214-8.50C.

Leuschner, Horst, to Texas Instruments Incorporated. Low cost remote control receiver. 4,052,701, Cl. 340-171.00R.

Leuschner, Horst: *See*—
Soobik, Lembit; and Leuschner, Horst, 4,052,700, Cl. 340-171.0PF.

Leutner, Bernd: *See*—
Schoenafinger, Eduard; and Leutner, Bernd, 4,052,326, Cl. 252-62.560.

Levecque, Marcel; and Battigelli, Jean A., to Saint-Gobain Industries. Method and apparatus for suppression of pollution in toration of glass fibers. 4,052,183, Cl. 65-3.00C.

Levine, Norman S. Synthetic skin wound dressing. 4,051,848, Cl. 128-156.000.

Levine, Seymour D.: *See*—
Stiller, Eric T.; Levine, Seymour D.; Principe, Pacifico A.; and Diassi, Patrick A., 4,052,436, Cl. 560-52.000.

Levis, William W., Jr.: *See*—
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,052,345, Cl. 260-2.5AP.

Levy, Stephen David: *See*—
Schrider, Michael Stanley; and Levy, Stephen David, 4,052,381, Cl. 260-206.000.

Lew, Hyok Sang. Variable tension ring exerciser. 4,052,070, Cl. 272-120.000.

Lewis, Blair F.: *See*—
United States of America, National Aeronautics and Space Administration; Grunthaner, Frank J.; and Lewis, Blair F., 4,052,614, Cl. 250-310.000.

Lichtin, Norman N.; and Wildes, Peter D., to Boston University, The Trustees of. Electrolytes which are useful in solar energy conversion. 4,052,536, Cl. 429-105.000.

Licke, George C., to Ethyl Corporation. Process for producing diurethane from dinitro compounds, hydroxyl compounds and carbon monoxide. 4,052,420, Cl. 260-351.000.

Licke, George C., to Ethyl Corporation. Process for producing urethane from nitro compounds, hydroxyl compounds and carbon monoxide using rhodium oxide catalysts. 4,052,437, Cl. 560-25.000.

Lie, Bjorn: *See*—
Dorph, Thor, 4,051,617, Cl. 43-18.00R.

Lie, Gina: *See*—
Dorph, Thor, 4,051,617, Cl. 43-18.00R.

Liedek, Egon: *See*—
Heckl, Leonhard; Liedek, Egon; and Ruff, Wolfgang, 4,052,378, Cl. 260-155.000.

Liljeros, Rolf Sven Gunnar. Mechanism for opening and closing a movable member. 4,051,746, Cl. 74-520.000.

Lin, Yeong S.; and Stanland, Jackson E., to International Business Machines Corporation. Bubble lattice file using movable fixed lattice. 4,052,711, Cl. 340-174.0TF.

Lindemann Maschinenfabrik GmbH: *See*—
Kaffka, Dietmar, 4,051,955, Cl. 214-1.0BB.

Lindsay, Ernest Harold, Jr.; and Daubert, Richard Francis, Jr., to Illinois Tool Works Inc. One-piece molded filter. 4,052,315, Cl. 210-232.000.

Lindsey, Alfred L., to Honeywell Inc. Timing system for measuring angle of advance of fuel injection. 4,052,663, Cl. 324-16.00R.

Linjegods A/S: *See*—
Staff, Finn; and Svensson, Christer, 4,051,959, Cl. 214-38.0BA.

Linn, Randy W.: *See*—
Trumley, Richard L.; and Linn, Randy W., 4,051,626, Cl. 47-17.000.

Liquid Carbonic Canada Ltd.: *See*—
Ross, Edward Alan, 4,051,886, Cl. 164-16.000.

Livick, Lester R. Bread slicer useable by a blind person. 4,051,758, Cl. 83-437.000.

Loberg, Hans O., to General Electric Company. Isolated semiconductor gate control circuit. 4,052,623, Cl. 307-251.000.

Lobos, Zbigniew Jack: *See*—
Wei, Yung-Kang; and Lobos, Zbigniew Jack, 4,052,542, Cl. 526-46.000.

Loch, Ernst, to Zellweger Uster AG. Method and apparatus for the moisture measurement of flat structures, especially textile webs. 4,051,719, Cl. 73-73.000.

Lockwood, Harry Francis; and Ettenberg, Michael, to RCA Corporation. Liquid phase epitaxial growth with interfacial temperature difference. 4,052,252, Cl. 156-622.000.

Lockwood, James L., Jr. Method for installing ceiling panels in a tunnel. 4,051,682, Cl. 61-45.00R.

Lombardi, Francis T.: *See*—
Lombardi, Jack P.; Lombardi, Francis T.; and Lombardi, Tarky J., Jr., 4,051,639, Cl. 52-64.000.

Lombardi, Jack P.; Lombardi, Francis T.; and Lombardi, Tarky J., Jr., to Syracuse Tank & Manufacturing Co., Inc. Removable deck for a building structure interstitial space. 4,051,639, Cl. 52-64.000.

Lombardi, Tarky J., Jr.: *See*—
Lombardi, Jack P.; Lombardi, Francis T.; and Lombardi, Tarky J., Jr., 4,051,639, Cl. 52-64.000.

Lonza, Ltd.: *See*—
Feneberger, Kurt; and Gely, Rolf, 4,052,323, Cl. 252-23.000.

Loomans, Maurice E.: *See*—
McDermott, James A.; Anderson, Robert L.; and Loomans, Maurice E., 4,052,515, Cl. 424-343.000.

Lorentzen, Alan P.: *See*—
Schwartz, Michael G.; Lorentzen, Alan P.; and Bucheck, David J., 4,052,306, Cl. 210-242.00S.

Lorenz, Hans Peter: *See*—
Dahl, Helmut; and Lorenz, Hans Peter, 4,052,447, Cl. 260-514.00G.

Lorenz, Hellmut; and Bunger, Heino, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Friction false twister. 4,051,655, Cl. 57-77.400.

Lorenz, Michael. Child's lamp and audio device. 4,052,622, Cl. 307-112.000.

Lott, George T.; and Kiewert, Harold J., to Lott Tool Corporation. Automatic snag grinder. 4,052,175, Cl. 51-96.000.

Lott Tool Corporation: *See*—
Lott, George T.; and Kiewert, Harold J., 4,052,175, Cl. 51-96.000.

Louderback, George D., Sr. Lift mechanism for truck sideboards. 4,052,106, Cl. 298-23.0MD.

Louis G. Freeman Company: *See*—
Freeman, David Bruce; Patton, Michael C.; and Dragan, Carl F., 4,051,569, Cl. 12-146.0CK.

Love, Robert J.; and Graff, James C., to General Electric Company. Flare-wedge lamp. 4,052,638, Cl. 313-318.000.

Lovisa, Peter R.; Tausanovitch, Dusan; and Lovisa, Tullio E. Exterior form spreader system for threaded end concrete ties. 4,052,032, Cl. 249-40.000.

Lovisa, Tullio E.: *See*—
Lovisa, Peter R.; Tausanovitch, Dusan; and Lovisa, Tullio E., 4,052,032, Cl. 249-40.000.

Low, Ian Alexander: *See*—
Gregory, Richard Langton; and Low, Ian Alexander, 4,052,571, Cl. 179-107.00R.

Lowery, Dennis J.; Merchant, Robert E.; and Walls, Milton A., to Dixson, Inc. Oncoming air spoilers for vehicles, mounted near the hood to deflect air carried bugs, rain, road spray, snow, and lightweight debris up and away from the windshield. 4,052,099, Cl. 296-91.000.

Lowrigkeit, Paul E. Paving stone. 4,052,131, Cl. 404-34.000.

Lowry, Eric G.: *See*—
Arena, Ronald D.; and Lowry, Eric G., 4,052,327, Cl. 252-141.000.

Lucas Electrical Company Limited: *See*—
Martin, Frederick Raymond Patrick, 4,052,609, Cl. 362-71.000.

Luhman, Robert A.; and Ward, John R., to Minnesota Mining and Manufacturing Company. Taping device and method of taping. 4,052,240, Cl. 156-212.000.

Lukhmanov, Viktor Mikhailovich: *See*—
Komarov, Jury Ivanovich; Lukhmanov, Viktor Mikhailovich; and Kovalev, Gennady Ivanovich, 4,051,872, Cl. 139-436.000.

Lutz, David Edward. Load bracing device. 4,052,083, Cl. 280-179.00R.

Luyckx, Leon, to Reactive Metals & Alloys Corporation. Zirconium alloy additive and method for making zirconium additions to steels. 4,052,202, Cl. 75-129.000.

Lynch, Thomas J.: *See*—
Kehl, William L.; and Lynch, Thomas J., 4,052,544, Cl. 526-102.000.

Lyons, Bernard J., to Raychem Corporation. Hydroxy aromatic compound containing sulfur and an organic phosphonate as polymer antioxidant. 4,052,279, Cl. 204-159.150.

Lytle, William F.; and Cathcart, Thomas E., Jr., to Waterbury Scroll Pen Corporation. Universal snap mounting for disposable chart pens. 4,052,713, Cl. 346-140.00A.

M & T Chemicals Inc.: *See*—
Beiter, Charles B.; and Hafner, Lee A., 4,052,354, Cl. 260-29.60M.
Harbulak, Edward P.; and Lash, Ronald J., 4,052,254, Cl. 156-664.000.

MacArthur, Samuel E.; and Smith, Stanley N., to Federal-Mogul Corporation. Shaft seal with clinch-butt metal case and method of making same. 4,052,077, Cl. 277-183.000.

MacDonald, Ronald A. Air separating apparatus. 4,051,689, Cl. 62-5.000.

Machnev, Evgeny Alexeevich: *See*—
Sidyakin, Vitaly Alexandrovich; Sabantsev, Alexandr Nikolaevich; Lapin, Evgeny Mikhailovich; and Machnev, Evgeny Alexeevich, 4,052,585, Cl. 219-100.000.

MacKay, William Allan, to D.D.I. Communications, Inc. Multiplexer transmitter terminator. 4,052,566, Cl. 179-15.00A.

MacKay, William Allan, to D.D.I. Communications, Inc. Multiplexer receiver terminator. 4,052,567, Cl. 179-15.0AL.

MacNitt, Donald G., Jr.: *See*—
Walker, Bryant H.; Carruthers, William D.; and MacNitt, Donald G., Jr., 4,051,585, Cl. 29-156.80R.

Maeshima, Tsugio: *See*—
Nishikawa, Eiichiroh; Itoh, Takuji; Maeshima, Tsugio; and Kamiyama, Setsuo, 4,052,337, Cl. 252-455.00Z.

Mageli, Orville L.: *See*—
McKellin, Wilbur H.; Mageli, Orville L.; and D'Angelo, Antonio Joseph, 4,052,543, Cl. 526-48.000.

Mahay & Cie: *See*—
Pifferi, Marc Laurent, 4,051,559, Cl. 3-1.912.

Mahn, Gustav: *See*—
Brotzmann, Karl; Knuppel, Helmut; Rheinlander, Paul; and Mahn, Gustav, 4,052,197, Cl. 75-60.000.
Rheinlander, Paul; Mahn, Gustav; Schulz, Klaus, deceased; Ruhland, Ingrid, legal representative; and Berner, Klaus, 4,052,043, Cl. 266-207.000.

Mahr, Manfred: *See*—
Chromy, Franz; Winkler, Walter; Mahr, Manfred; and Mark, Fritz, 4,051,990, Cl. 227-10.000.

Mair, Barrie; and Schumann, Bernard Roy, to Mars Limited. Drinking

cup structured to enhance beverage blending. 4,052,037, Cl. 366-341.000.
Maitland, David Steven; and Thayer, Billy E., to Hewlett-Packard Company. Binary adder. 4,052,604, Cl. 364-786.000.
Malfroid, Pierre, to Solvay & Cie. Process for the manufacture of alkylacetophenones. 4,052,459, Cl. 260-592.000.
Mallory, Henry Rogers, to P. R. Mallory & Co. Inc. Electrical device. 4,052,537, Cl. 429-174.000.
Mammino, Joseph; and Jossel, Franklin, to Xerox Corporation. Electrostatographic imaging process. 4,052,207, Cl. 96-1.200.
Mandlak, Louis John. Powder gun. 4,051,981, Cl. 222-189.000.
Mangalick, Mahesh C., to Carborundum Company, The. Gas injection method. 4,052,199, Cl. 75-68.00R.
Manschot, James G.; Mather, Byron L.; and Balistreri, Thomas W., to Plastronics, Inc. Combination hanger and clamp member for bedside drainage bag. 4,051,578, Cl. 251-4.000.
Manshausen, Theodor: *See*—
Suprunov, Vladimir; Kryczun, Alfred; and Manshausen, Theodor, 4,051,602, Cl. 34-10.000.
Mansmann, Manfred; and Brandle, Karl, to Bayer Aktiengesellschaft. Production of low-sulfur chromium (III) oxide pigment. 4,052,225, Cl. 106-302.000.
Marantette, Ruth B.: *See*—
Marantette, William E.; and Marantette, Ruth B., 4,052,653, Cl. 318-568.000.
Marantette, William E.; and Marantette, Ruth B. Analog data recording and playback system for path control. 4,052,653, Cl. 318-568.000.
Marceno, Josephine. Baking device. 4,052,034, Cl. 249-110.000.
Marcus, Konrad H., to Prince Corporation. Rearview mirror assembly with plurality of simultaneously movable mirrors. 4,052,124, Cl. 350-304.000.
Marczewski, George A. Drive belt with connector. 4,051,741, Cl. 74-231.00J.
Marek, Cecil J., to United States of America, National Aeronautics and Space Administration. Fuel combustor. 4,052,144, Cl. 431-352.000.
Margaris, Panajotis: *See*—
Schmitt, Reinhold; Freygang, Hans-Joachim; and Margaris, Panajotis, 4,052,668, Cl. 324-126.000.
Marhold, Werner: *See*—
Bruce, Roger K.; and Marhold, Werner, 4,052,249, Cl. 156-513.000.
Marigold Enterprises Ltd.: *See*—
Ho, Hoi, 4,051,984, Cl. 222-471.000.
Marinik, James A., to Dow Corning Corporation. High modulus silicone rubber. 4,052,357, Cl. 260-37.0SB.
Marino, Peter Thomas: *See*—
Baca, Joseph Philip; and Marino, Peter Thomas, 4,052,741, Cl. 360-77.000.
Mark, Fritz: *See*—
Chromy, Franz; Winkler, Walter; Mahr, Manfred; and Mark, Fritz, 4,051,990, Cl. 227-10.000.
Markus, Franklyn M.: *See*—
Nikitits, Edwin; and Demers, Jean Guy, 4,052,100, Cl. 297-159.000.
Markusch, Peter: *See*—
Dieterich, Dieter; and Markusch, Peter, 4,052,347, Cl. 260-2.5AK.
Marquis, Edward T.; and Watts, Lewis W., Jr., to Texaco Development Corporation. Method of preparing polyaminopolyphenylmethanes. 4,052,456, Cl. 260-570.00D.
Marrs, Oren L.; Reusser, Robert E.; and Tieszen, Dale O., to Phillips Petroleum Company. Pipe coating composition. 4,052,219, Cl. 106-14.000.
Mars Limited: *See*—
Mair, Barrie; and Schumann, Bernard Roy, 4,052,037, Cl. 366-341.000.
Marshall, Hamilton W., Jr.: *See*—
Atwood, John G.; Marshall, Hamilton W., Jr.; and Heinz, Peter H., 4,052,161, Cl. 23-230.00R.
Marshall, Stuart Malcolm: *See*—
Broughton, Barbara Joyce; Large, Bryan John; Marshall, Stuart Malcolm; Pain, David Lord; and Wooldridge, Kenneth Robert Harry, 4,052,390, Cl. 544-118.000.
Martin, Barrie James; and Bridger, Victor Ernest, to Plessey Handel und Investments A.G. Vibratory atomizer. 4,052,004, Cl. 239-102.000.
Martin Engineering Company: *See*—
Stetson, Harold M., 4,051,982, Cl. 222-195.000.
Martin, Frederick Raymond Patrick, to Lucas Electrical Company Limited. Motor vehicle with headlamp tilting mechanism. 4,052,609, Cl. 362-71.000.
Martin Marietta Corporation: *See*—
Baxter, Denmer Dix; and Reeves, Charles Michael, 4,052,565, Cl. 179-1.50S.
Martin, William F., to Herring, James A., a part interest. Apparatus for separating solids from liquids. 4,052,311, Cl. 210-223.000.
Martinelli, Michael A. Image recording medium employing photoconductive granules and a heat disintegrable layer. 4,052,208, Cl. 96-1.50R.
Martini, Thomas, to Hoechst Aktiengesellschaft. Process for preparing perfluorinated ethers. 4,052,277, Cl. 204-158.00R.
Maruyama, Koichi: *See*—
Yamazaki, Eiichi; Ogura, Iwao; Ueda, Toshio; Maruyama, Koichi; and Shimizu, Kenji, 4,052,122, Cl. 350-189.000.
Yamazaki, Eiichi; Ueda, Toshio; and Maruyama, Koichi, 4,052,123, Cl. 350-189.000.
Maruyama, Mikio: *See*—
Itani, Mituo; Kawashima, Hiroyuki; Inoue, Takasuke; and Maruyama, Mikio, 4,051,796, Cl. 114-44.000.
Maruyama, Takeo: *See*—
Nakamura, Tatsuji; Fukuda, Kenji; Tsuji, Toshihiko; Maruyama, Takeo; Sakai, Ryouji; Sawada, Shohei; and Miyoshi, Haruki, 4,052,588, Cl. 219-345.000.
Masaki, Kenji; and Okamura, Kenji, to Nissan Motor Company, Limited. Multi-cylinder internal combustion engine. 4,051,672, Cl. 60-277.000.
Masaki, Kenji, to Nissan Motor Company, Limited. Automotive internal combustion engine. 4,051,673, Cl. 60-282.000.
Masaki, Kenji, to Nissan Motor Company, Limited. Method of and apparatus for controlling air-fuel mixtures into a multi-cylinder internal combustion engine. 4,051,816, Cl. 123-32.0EA.
Maschinenfabrik Turner GmbH: *See*—
Dokoupil, Jiri, 4,051,700, Cl. 69-33.000.
Masclet, Jean, to Messier-Hispano. Disc brake with graphite friction linings. 4,051,930, Cl. 188-251.00A.
Mason, Leonard; and Anderson, Clifford, to Lee-Mason Tools Ltd. Spline mechanism for drill tools. 4,051,696, Cl. 64-23.000.
Massey-Ferguson Inc.: *See*—
Dowd, Allyn C.; and Rahman, Habibur, 4,051,860, Cl. 137-271.000.
Massey, Navarre Andre. Load handling method and apparatus. 4,051,968, Cl. 214-506.000.
Massey, William A.; and Evans, Donald J., to Molins Machine Company, Inc. Speed control system for a corrugator. 4,052,646, Cl. 318-39.000.
Masurekar, Prakash S.; and Goodhue, Charles T., to Eastman Kodak Company. Production of cholesterol esterase using *Nocardia cholesterolicum*. 4,052,263, Cl. 195-66.00R.
Materials Technology Corporation: *See*—
Fonzi, Frank, 4,052,530, Cl. 428-552.000.
Mathauser, William R. Rod with strike signalling apparatus. 4,051,616, Cl. 43-17.000.
Mather, Byron L.: *See*—
Manschot, James G.; Mather, Byron L.; and Balistreri, Thomas W., 4,051,578, Cl. 251-4.000.
Mathis, Ronald D.: *See*—
Dix, James S.; and Mathis, Ronald D., 4,052,351, Cl. 260-23.00H.
Matier, William L.; and Comer, William T., to Mead Johnson & Company. Styrylamidines. 4,052,455, Cl. 260-562.00R.
Matsui, Shigeru, to Nippon Gakki Seizo Kabushiki Kaisha. Switch with movable and fixed contacts. 4,052,581, Cl. 200-283.000.
Matsumoto, Masaki: *See*—
Yazawa, Masahide; Tani, Haruhisa; Matsumoto, Masaki; and Sasaki, Yasuo, 4,052,242, Cl. 156-265.000.
Yazawa, Masahide; Tani, Haruhisa; Matsumoto, Masaki; and Sasaki, Yasuo, 4,052,243, Cl. 156-265.000.
Matsumoto, Shoichi: *See*—
Mogi, Minoru; and Matsumoto, Shoichi, 4,051,823, Cl. 123-117.00A.
Matsushita Electric Industrial Co., Ltd.: *See*—
Fujita, Osamu, 4,052,645, Cl. 315-388.000.
Fukuda, Yoji; Fukushima, Fumio; Tsujimoto, Yoshinobu; Fukai, Masakazu; and Sugai, Shinji, 4,052,329, Cl. 252-301.40F.
Hayakawa, Daishiro; and Tani, Kenroku, 4,052,627, Cl. 310-322.000.
Hosomi, Fumio; Wasa, Kiyotaka; Eayakawa, Shigeru; and Nagai, Takeshi, 4,052,738, Cl. 358-128.000.
Miyamoto, Kunito, 4,052,674, Cl. 325-374.000.
Mori, Kazuhiro; and Misawa, Yoshihiko, 4,051,593, Cl. 29-564.600.
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, 4,052,749, Cl. 360-123.000.
Sakamoto, Yoichi; Kato, Nobuyuki; and Ohtani, Tadao, 4,051,706, Cl. 72-253.00R.
Wada, Masanobu; Koike, Yujiro; and Okuma, Yoshihisa, 4,052,739, Cl. 358-299.000.
Mattern, Gunter, to Ciba-Geigy Corporation. Process for the production of 3-hydroxy-2-imino-(2H)-pyridinesulphonic acid monohydrate. 4,052,406, Cl. 260-294.80R.
Matuokadeclare, Kazuyuki: *See*—
Sakakibara, Kouzou; Abe, Iwao; Yokoyama, Takushi; and Matuokadeclare, Kazuyuki, 4,052,462, Cl. 260-604.00R.
Maul, Rudolf: *See*—
Wehner, Wolfgang; Maul, Rudolf; and Jung, Hans-Wolf, 4,052,426, Cl. 260-429.700.
Maus, Helmut Walter: *See*—
Reifenhauser, Toni; and Maus, Helmut Walter, 4,051,757, Cl. 83-404.300.
Mauz, Otto: *See*—
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Maxman AG: *See*—
Andersen, Bjorn, 4,052,562, Cl. 179-1.0HF.
May & Baker Limited: *See*—
Broughton, Barbara Joyce; Large, Bryan John; Marshall, Stuart Malcolm; Pain, David Lord; and Wooldridge, Kenneth Robert Harry, 4,052,390, Cl. 544-118.000.
Mayer, Kurt, to BASF Aktiengesellschaft. Manufacture of lactones of the triphenylmethane series. 4,052,415, Cl. 260-343.400.
Mazer Corporation, The: *See*—
Pflaum, William D.; and Tullis, Mark E., 4,051,778, Cl. 101-133.000.
McAlpine Prestcold Limited: *See*—
Needham, Frederick Johnston, 4,051,693, Cl. 62-262.000.
McClellan, Bingham A., to McClellan Industries, Inc. Artificial fishing lure. 4,051,619, Cl. 43-42.240.
McClellan Industries, Inc.: *See*—
McClellan, Bingham A., 4,051,619, Cl. 43-42.240.

McClure, Clifton M., III. Life support system for divers. 4,051,846, Cl. 128-142.00R.
McClure, James D., to Shell Oil Company. Toluene disproportionation process using an unsupported perfluorinated polymer catalyst. 4,052,474, Cl. 260-672.00T.
McClure, James D.; and Brandenberger, Stanley G., to Shell Oil Company. Toluene disproportionation process using a supported perfluorinated polymer catalyst. 4,052,475, Cl. 260-672.00T.
McCoy, John J.: *See—*
Zajacek, John G.; McCoy, John J.; and Fuger, Karl E., 4,052,454, Cl. 260-553.00A.
McCullough, Robert E.: *See—*
O'Connor, Arthur H.; and McCullough, Robert E., 4,051,662, Cl. 58-4.00A.
McDermott, James A.; Anderson, Robert L.; and Loomans, Maurice E., to Proctor & Gamble Company, The. Method of treating acne with alcohol. 4,052,515, Cl. 424-343.000.
McDonnell Douglas Corporation: *See—*
Smatko, Joseph S., 4,052,540, Cl. 429-229.000.
McFee, Richard. Water distiller. 4,052,267, Cl. 202-185.00B.
McGinnis, Vincent D., to SCM Corporation. UV curing of polymerizable binders. 4,052,280, Cl. 204-159.140.
McGregor, Howard Norman; and Chanaud, Robert Charles. Dynamic sound controller and method therefor. 4,052,720, Cl. 340-420.000.
McGroddy, James Cleary; and Scott, Bruce Albert, to International Business Machines Corporation. Method of depositing metal conducting patterns on large area surfaces. 4,052,272, Cl. 204-15.000.
McKellin, Wilbur H.; Mageli, Orville L.; and D'Angelo, Antonio Joseph, to Pennwalt Corporation. Vulcanizable and vulcanized compositions containing polyperoxide. 4,052,543, Cl. 526-48.000.
Mead Johnson & Company: *See—*
Matier, William L.; and Comer, William T., 4,052,455, Cl. 260-562.00R.
Meadows, John W., to Quantor Corporation. Apparatus for developing and fixing heat sensitive film. 4,052,732, Cl. 354-297.000.
Mears, Whitney H.; and Orfeo, Sabatino R., to Allied Chemical Corporation. Gaseous dielectric compositions. 4,052,555, Cl. 174-17.0GF.
Meckl, Ferenc; and Piuk, Peter, to Banyaszati Kutato Intezet. Apparatus for measuring the velocity of low frequency vibrations. 4,051,718, Cl. 73-71.200.
Medico Developments, Inc.: *See—*
Chiulli, Robert D., 4,051,844, Cl. 128-20.000.
Meditz, William F.; and Congin, James V. Vehicle safe. 4,051,790, Cl. 109-58.000.
Meeks, John K.: *See—*
Holt, James W.; and Meeks, John K., 4,051,869, Cl. 137-636.100.
Mehesfalvi, Zsuzsanna, nee Vajna: *See—*
Ambrus, Gabor; Barta, Istvan; Mehesfalvi, Zsuzsanna, nee Vajna; and Horvath, Gyula, 4,052,407, Cl. 260-302.00R.
Meier, Ernst: *See—*
Credner, Hans Heinrich; Lassig, Wolfgang; Meier, Ernst; Ranz, Erwin; Schleger, Siegfried; and Schranz, Karl-Wilhelm, 4,052,213, Cl. 96-66.300.
Meijer, Jan Gerrit, to Meijer, Thomas Hanke Daniel. Devices for collecting bales of straw or other materials. 4,051,964, Cl. 214-152.000.
Meijer, Thomas Hanke Daniel: *See—*
Meijer, Jan Gerrit, 4,051,964, Cl. 214-152.000.
Meinan Machinery Works, Inc.: *See—*
Hasegawa, Katsuji, 4,051,882, Cl. 144-309.00D.
Melchior, August S. Directional heat transfer unit. 4,051,890, Cl. 165-32.000.
Mele, Anthony P. Solvent sink and dispenser. 4,051,858, Cl. 134-56.00R.
Melfi, Samuel T. Adjustable concrete form apparatus. 4,052,031, Cl. 249-19.000.
Mentha, John W.: *See—*
Cresswell, Ronald M.; Mentha, John W.; and Seaman, Russell L., 4,052,553, Cl. 542-469.000.
Mercer, James L.; and Togashi, Hachiro J., to CRYO-MAID Inc. Method and apparatus for extracting oil from hydrocarbonaceous solid material. 4,052,293, Cl. 208-11.00R.
Merchant, Robert E.: *See—*
Lowery, Dennis J.; Merchant, Robert E.; and Walls, Milton A., 4,052,099, Cl. 296-91.000.
Merck & Co., Inc.: *See—*
Anderson, Paul S.; Christy, Marcia E.; and Ponticello, Gerald S., 4,052,508, Cl. 424-258.000.
Merkl, George C. Method of forming a compound containing aluminum and glycerol. 4,052,429, Cl. 260-448.0AD.
Mersereau, Robert E.; and Silverman, Harold, to Pitney-Bowes, Inc. Sheet feeder. 4,052,051, Cl. 271-94.000.
Merz, Walter: *See—*
Dickore, Karlfried; Engels, Hans Dieter; Kratzer, Hans; and Merz, Walter, 4,052,460, Cl. 260-593.00H.
Mesaros, Stephen A.: *See—*
Tengler, John N.; Mesaros, Stephen A.; and Venaleck, John T., 4,052,117, Cl. 339-17.0CF.
Messerschmitt-Bolkow-Blohm Gesellschaft mit Beschrankter Haftung: *See—*
Thomanek, Franz Rudolf, 4,051,763, Cl. 89-36.00R.
Messier-Hispano: *See—*
Masclet, Jean, 4,051,930, Cl. 188-251.00A.
Messing, Theodor; and Wamser, Karl H., to Standard-Messo Duisburg Gesellschaft Fuer Chemietechnik mit Beschraenkter Haftung & Co. Process and apparatus for the fermentation of carbohydrate-containing nutrient substrate. 4,052,261, Cl. 195-36.00R.
Metacon AG: *See—*
Tinnes, Bernhard, 4,051,589, Cl. 29-405.000.
Metropolitan Wire Corporation: *See—*
Becker, Frederick R., III, 4,052,081, Cl. 280-79.300.
Metz, Lloyd E. Adjustable end gate assembly for pick-up truck or other vehicle. 4,052,098, Cl. 296-50.000.
Metz, Walter. Instrument for monitoring physical parameters of temperature and pressure. 4,051,728, Cl. 73-343.00R.
Metzger, Jacques: *See—*
Samat, Andre; Guglielmetti, Robert; and Metzger, Jacques, 4,052,218, Cl. 96-114.100.
Meyer, Gunter; Radke, Dietrich; and Reimann, Gunter, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Method for melting iron-containing material. 4,052,195, Cl. 75-10.00R.
Michalczyk, Georg; and Gluzek, Karl-Heinz, to Deutsche Texaco Aktiengesellschaft. Catalyst for the production of gamma-butyrolactone and a method for preparing the catalyst. 4,052,335, Cl. 252-446.000.
Michel, Jacques; and Iost, Michel, to U.S. Philips Corporation. Method of manufacturing a semiconductor device and semiconductor device manufactured by using said method. 4,052,269, Cl. 204-15.000.
Micka, William Frank; and Robinson, Thomas Scott, to International Business Machines Corporation. High speed real time image transformation. 4,052,699, Cl. 340-146.3MA.
Mikstais, Uldis Yanovich: *See—*
Giller, Solomon Aronovich; Venter, Karl Karlovich; Trushule, Margarita Aldonovna; Berggrin, Guntis Erikovich; Brinkmanis, Robert Avgustovich; Mikstais, Uldis Yanovich; and Stankevich, Paul Alexandrovich, 4,052,419, Cl. 260-347.400.
Mikulas, Martin M., Jr.: *See—*
Rhodes, Marvin D.; and Mikulas, Martin M., Jr., 4,052,523, Cl. 428-116.000.
Milgo Electronic Corporation: *See—*
Chiu, Ran-Fun; Sherman, James Bryon; and Gilbert, Judson Truman, 4,052,557, Cl. 178-67.000.
Mill & Mix Company, Inc.: *See—*
Feist, Donovan R., 4,052,012, Cl. 241-100.000.
Millard, Keith, to Decatur Electronics, Inc. Traffic radar and apparatus therefor. 4,052,722, Cl. 343-8.000.
Miller, Charles G.: *See—*
United States of America, National Aeronautics and Space Administration; Miller, Charles G.; and Pohl, Jens G., 4,051,834, Cl. 126-271.000.
Miller, Coleman J., to Westinghouse Electric Corporation. Randomly agglomerated subarrays for phased array radars. 4,052,723, Cl. 343-100.0LE.
Miller, Franklin E. Blackjack play director. 4,052,073, Cl. 273-148.00R.
Miller, J. B., to Phillips Petroleum Company. Testing shaft seals without pressuring system to operating pressure. 4,051,717, Cl. 73-46.000.
Miller, Roland E.: *See—*
Valek, John; Miller, Roland E.; and Scaletta, Joseph A., 4,051,707, Cl. 72-348.000.
Mills, King L.; and Denton, Roy V., to Phillips Petroleum Company. Catalytic reduction of aldehydes to alcohols. 4,052,467, Cl. 260-638.00B.
Mindler, Fredric Alton: *See—*
Hochreiter, William Thomas; and Mindler, Fredric Alton, 4,052,730, Cl. 354-135.000.
Mine Support Systems (Proprietary) Limited: *See—*
Townsend, Rodney C., 4,052,029, Cl. 248-356.000.
Minnesota Mining and Manufacturing Company: *See—*
Huffman, William A.; Birkeland, Stephen P.; and O'Leary, Kevin P., 4,052,209, Cl. 96-1.50R.
Larson, Wayne K., 4,052,368, Cl. 260-75.00S.
Luhman, Robert A.; and Ward, John R., 4,052,240, Cl. 156-212.000.
Pastor, Sheldon Lee; Erickson, Milton E.; and Kahn, Donald D., 4,052,742, Cl. 360-96.000.
Schwartz, Michael G.; Lorentzen, Alan P.; and Bucheck, David J., 4,052,306, Cl. 210-242.00S.
Mir, Leon, to Avco Corporation. Materials handling apparatus for a ferrofluid sink/float separator. 4,052,297, Cl. 209-1.000.
Misawa, Yoshihiko: *See—*
Mori, Kazuhiro; and Misawa, Yoshihiko, 4,051,593, Cl. 29-564.600.
Mita, Yasuhiro; Yamazaki, Takayuki; and Izumi, Takahisa, to Nissan Motor Company, Limited. Converter with catalyst pellets. 4,052,166, Cl. 23-288.00F.
Mitchell, Jack H. Precooked peanut-containing materials and process for making the same. 4,052,516, Cl. 426-271.000.
Mitsubishi Chemical Industries Ltd.: *See—*
Nishitani, Kiyoshi; Ebina, Ryuzo; Sukekawa, Ikuo; and Shintani, Shuji, 4,051,787, Cl. 108-55.300.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Kamaike, Hiroshi, 4,052,651, Cl. 318-230.000.
Takeichi, Yoshihiro; Hashimoto, Tsutomu; Takeda, Fumio; and Katagi, Takashi, 4,052,724, Cl. 343-786.000.
Yoshino, Masataka; and Oguri, Atsushi, 4,051,898, Cl. 165-166.000.
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Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, 4,052,632, Cl. 219-137.00R.
Shirakawa, Seiichi; Iwahashi, Koji; Nishi, Akio; Honda, Keisuke; and Taoda, Kiyomichi, 4,052,172, Cl. 48-197.00R.
Mitsubishi Petrochemical Co., Ltd.: *See—*
Kubushiro, Kanemitsu, 4,052,282, Cl. 204-159.230.

Mitsubishi Rayon Co., Ltd.: *See*—
Ide, Fumio; Kishida, Kazuo; and Hasegawa, Akira, 4,052,482, Cl. 260-876.00R.
Ide, Fumio; Kishida, Kazuo; and Hasegawa, Akira, 4,052,525, Cl. 428-412.000.
Mitsui Engineering & Shipbuilding Co., Ltd.: *See*—
Itani, Mituo; Kawashima, Hiroyuki; Inoue, Takasuke; and Maruyama, Mikio, 4,051,796, Cl. 114-44.000.
Mitteregger, Anton, to Dr. Ernst Fehrer Gesellschaft m.b.H. & Co., K.G. Textilmaschinenfabrik u. Stahlbau. Apparatus for spinning textile fibers. 4,051,653, Cl. 57-58.890.
Mixan, Craig E.; and Pews, R. Garth, to Dow Chemical Company, The. 2-(Dicyanomethylene)-1,3-dithiolo-(4,5-b)pyrazine-5,6-dicarbonitrile. 4,052,394, Cl. 260-250.0BC.
Miyake, Takao; Koashi, Katsue; and Sawada, Masato, to Kurashiki Boseki Kabushiki Kaisha. Method and apparatus for counting yarn-splicing frequencies of spindles in automatic winding machine. 4,052,018, Cl. 242-36.000.
Miyamoto, Kunito, to Matsushita Electric Industrial Co., Ltd. VHF tuner device. 4,052,674, Cl. 325-374.000.
Miyamoto, Nobutaka: *See*—
Hirano, Satoru; Kubota, Atsushi; Yoshida, Mitsuru; Mizuno, Junzi; and Miyamoto, Nobutaka, 4,051,652, Cl. 57-52.000.
Miyashita, Osamu: *See*—
Furukawa, Yoshiyasu; and Miyashita, Osamu, 4,052,391, Cl. 544-117.000.
Miyata, Junjiro; and Kikuchi, Yasushi, to Asahi Breweries, Ltd. Apparatus for obtaining lupulin-rich products from hops. 4,051,771, Cl. 99-276.000.
Miyoshi, Haruki: *See*—
Nakamura, Tatsuji; Fukuda, Kenji; Tsuji, Toshihiko; Maruyama, Takeo; Sakai, Ryouji; Sawada, Shohei; and Miyoshi, Haruki, 4,052,588, Cl. 219-345.000.
Miyoshi, Hiroshi: *See*—
Shiohara, Tomoo; Kohara, Minoru; and Miyoshi, Hiroshi, 4,052,350, Cl. 260-23.0XA.
Mizuno, Junzi: *See*—
Hirano, Satoru; Kubota, Atsushi; Yoshida, Mitsuru; Mizuno, Junzi; and Miyamoto, Nobutaka, 4,051,652, Cl. 57-52.000.
Mobil Oil Corporation: *See*—
Braid, Milton, 4,052,324, Cl. 252-32.500.
Chang, Clarence D.; Lang, William H.; and Silvestri, Anthony J., 4,052,479, Cl. 260-682.000.
Cushman, Donald R.; Pagen, Charles A.; Schick, John W.; and Yan, Tsoung-Yuan, 4,052,290, Cl. 208-6.000.
Donk, Daniel Lawrence; and Olson, Robert Hutchins, 4,051,994, Cl. 229-65.000.
Espenscheid, Wilton F.; and Yan, Tsoung-Yuan, 4,052,291, Cl. 208-8.000.
Espenscheid, Wilton F.; and Yan, Tsoung-Yuan, 4,052,292, Cl. 208-8.000.
Givens, Edwin Neil; Plank, Charles Joseph; and Rosinski, Edward Joseph, 4,052,472, Cl. 260-668.00B.
Ireland, Henry R.; Peters, Alan W.; and Stein, Thomas R., 4,052,477, Cl. 260-676.00R.
Morrison, Roger A., 4,052,476, Cl. 260-672.00T.
Yan, Tsoung-Yuan, 4,052,170, Cl. 44-1.00R.
Mockett, Keith Henry George, to BP Chemicals Limited. Catalyst support. 4,052,334, Cl. 252-429.00R.
Moe, Walter. Truck hoist. 4,052,105, Cl. 298-22.00J.
Mogi, Minoru; and Matsumoto, Shoichi, to Fuji Jukogyo Kabushiki Kaisha. Internal combustion engine. 4,051,823, Cl. 123-117.00A.
Mojden, Wallace W.; Davila, Jose E.; Hooper, George W.; Kwiatkowski, Gerald M.; and Pantel, Howard W., Jr., to Fleetwood Systems, Inc. Filled bag handling and storage apparatus. 4,051,965, Cl. 214-16.40A.
Molay, Ira, to Audiophonics Corporation. Lectern with detent-hinged shelf for portable sound system. 4,052,561, Cl. 179-1.0AT.
Molins Machine Company, Inc.: *See*—
Massey, William A.; and Evans, Donald J., 4,052,646, Cl. 318-39.000.
Moll, Franz; and Rosenhahn, Lothar, to AGFA-Gevaert, A.G. Color photographic multilayered material with improved color density. 4,052,215, Cl. 96-84.00R.
Monkovic, Ivo; Bachand, Carol; and Wong, Henry, to Bristol-Myers Company. Derivatives of 9,10-dihydroxy-1-(p-alkoxybenzyl)-perhydroisoquinoline oxazine-3-one. 4,052,389, Cl. 544-89.000.
Monnet, Bernard Leon, to Billion S.A. Method of injection-moulding by injection of an article composed of at least three different materials. 4,052,497, Cl. 264-255.000.
Monsanto Company: *See*—
Harakas, Nicholas K.; Fulton, Kent H.; Tierney, Paul A.; and Bender, Malcolm F., 4,052,524, Cl. 428-383.000.
Harris, Alva F.; and Shapras, Peter, 4,052,348, Cl. 260-5.000.
Higginbottom, Harold P., 4,052,359, Cl. 260-17.500.
Lee, Emerson H., 4,052,333, Cl. 252-416.000.
Sternberg, Ernest M., 4,052,146, Cl. 425-463.000.
Tinker, Harold Burnham; and Morris, Donald E., 4,052,461, Cl. 260-599.000.
Montagna, Angelo Anthony, to Gulf Research & Development Company. Hydrogenation process employing a zinc promoted catalyst. 4,052,296, Cl. 208-216.000.
Montedison S.p.A.: *See*—
Scardigno, Salvatore; Rivolta, Luigi; Caprara, Giuseppe; and Cassar, Luigi, 4,052,452, Cl. 260-535.00R.
Mooney, Joseph R. Leak detector. 4,051,716, Cl. 73-40.50R.
Moore, Geoffrey James: *See*—
Case, John Reginald; and Moore, Geoffrey James, 4,052,405, Cl. 260-294.80R.
Morganite Modmor Limited: *See*—
Blakelock, Harold Dennis, 4,051,659, Cl. 57-140.00R.
Mori, Kazuhiro; and Misawa, Yoshihiko, to Matsushita Electric Industrial Co., Ltd. Component mounting apparatus. 4,051,593, Cl. 29-564.600.
Mori, Shigeru: *See*—
Yamada, Tatsunori; Mori, Shigeru; Kato, Kaoru; Arai, Yasuyuki; and Sakitani, Katumi, 4,051,888, Cl. 165-1.000.
Moroe, Michio: *See*—
Nagakura, Akira; Moroe, Michio; Koyama, Yasuto; and Kurihara, Haruki, 4,052,457, Cl. 260-586.00G.
Morris, Donald E.: *See*—
Tinker, Harold Burnham; and Morris, Donald E., 4,052,461, Cl. 260-599.000.
Morris, Dorsey J.: *See*—
Kontny, Merle E.; and Morris, Dorsey J., 4,052,492, Cl. 264-6.000.
Morrison, Roger A., to Mobil Oil Corporation. Toluene disproportionation over zeolite catalyst. 4,052,476, Cl. 260-672.00T.
Mortensen, Tage A. Fire and intruder detection and alarm apparatus. 4,052,716, Cl. 340-233.000.
Mortoly, John L., to James L. Taylor Mfg. Co. Jaw adapter for a clamp. 4,052,046, Cl. 269-208.000.
Morton-Norwich Products, Inc.: *See*—
Schwan, Thomas J., 4,052,399, Cl. 260-256.40C.
Schwan, Thomas J., 4,052,400, Cl. 260-256.40C.
Mory, Rudolf: *See*—
von der Crone, Jost; Pugin, Andre; and Mory, Rudolf, 4,052,410, Cl. 548-305.000.
Moser, Louis: *See*—
Graf, Felix; and Moser, Louis, 4,051,807, Cl. 118-401.000.
Mosso, Franco Achille, to Italba, S.p.A. Process and device for the filtration of liquids polluted by suspended solid bodies. 4,052,300, Cl. 210-20.000.
Motorola, Inc.: *See*—
Capurka, Zbynek Antonin; and Rumple, Ronald William, 4,051,827, Cl. 123-148.00E.
Enderby, Ralph Thomas; Steel, Francis Robert; and Victor, Alan Michael, 4,052,672, Cl. 325-147.000.
Kingzett, Thomas J., 4,052,253, Cl. 156-657.000.
Ramsland, David Gordon, 4,052,678, Cl. 330-281.000.
MRC Manufacturing Co.: *See*—
Zaagman, Robert N., 4,051,779, Cl. 101-242.000.
Mueller, Dale R.: *See*—
Hand, Ronnie D.; Chappelear, Robert N.; and Mueller, Dale R., 4,052,015, Cl. 242-18.00G.
Muhlbock, Franz: *See*—
Wienchol, Otto; and Muhlbock, Franz, 4,052,165, Cl. 23-259.000.
Mullen, John H.; and Taylor, Glenn R., to Westinghouse Electric Corporation. Rotary selector switch. 4,052,582, Cl. 200-330.000.
Muller, Hans, to Grapha-Holding AG. Apparatus for feeding and transporting signatures in bookbinding machines. 4,052,052, Cl. 271-157.000.
Murata, Hikaru. Hydraulic actuating system. 4,051,764, Cl. 91-29.000.
Murata Manufacturing Co., Ltd.: *See*—
Kojima, Tatsuo; and Kawai, Yoshio, 4,052,573, Cl. 200-11.0DA.
Muraviev, Alexandr Petrovich: *See*—
Baburin, Sergei Vyacheslavovich; Akimov, Vasily Ivanovich; Gorbushin, Vladimir Alexandrovich; Muraviev, Alexandr Petrovich; Nepein, Valery Nikolaevich; Frolov, Mikhail Vladimirovich; Aizenberg, Sergei Arnoldovich; Golovko, Evgeny Mikhailovich; Kamenev, Alexandr Fedorovich; and Sergeev, Igor Alexandrovich, 4,051,576, Cl. 19-156.000.
Murphy, Francis T.; Sagan, Peter; Rosenthal, Martin B.; and Ostrowski, Alfred R., to Seeburg Corporation, The. Coin or token operated amusement device. 4,051,939, Cl. 194-10.000.
Murphy, James A.: *See*—
Aronson, Bernard S.; and Murphy, James A., 4,052,273, Cl. 204-37.00R.
Murphy, Robert P.; and Spurlock, James W., to Standard Oil Company (Indiana). Log-inject-log in sand consolidation. 4,052,613, Cl. 250-259.000.
Musher, Evelyn: *See*—
Musher, Jeremy; and Su, Kai, 4,052,369, Cl. 260-77.5CH.
Musher, Jeremy; and Su, Kai, to Musher, Evelyn. Group V pentavalent atom-containing compositions. 4,052,369, Cl. 260-77.5CH.
Myers, Philip E., to Warner Electric Brake & Clutch Company. Breakaway protection for electrically controlled trailer brakes. 4,052,695, Cl. 340-52.00D.
N L Industries, Inc.: *See*—
Estes, James D., 4,051,907, Cl. 175-4.550.
Nabors, Jim B.: *See*—
Blackwell, J. Thomas; Gupton, John T.; and Nabors, Jim B., 4,052,397, Cl. 260-251.00R.
Nagai, Takeshi: *See*—
Hosomi, Fumio; Wasa, Kiyotaka; Eayakawa, Shigeru; and Nagai, Takeshi, 4,052,738, Cl. 358-128.000.
Nagakura, Akira; Moroe, Michio; Koyama, Yasuto; and Kurihara, Haruki, to Takasago Perfumery Co., Ltd. 3,7,11,11-Tetramethyl-spiro-[5,5]undeca-8-ene-1-one. 4,052,457, Cl. 260-586.00G.
Nagamori, Tomitada: *See*—
Yoshikawa, Toshio; Sakamoto, Nagayoshi; Kurita, Masayuki; Oh-e, Shunji; and Nagamori, Tomitada, 4,052,362, Cl. 260-45.9NC.

Nagano, Kentaro; Nomaki, Koji; Kutsukake, Yukinori; and Nanao, Junji, to Asahi Glass Company Ltd. Humidity sensor. 4,052,691, Cl. 338-35.000.

Nagano, Satoshi: *See*—
United States of America, National Aeronautics and Space Administration; and Nagano, Satoshi, 4,052,659, Cl. 363-57.000.

Nagao, Kameji: *See*—
Sera, Hidefumi; Yamamoto, Nobuo; Horie, Ikutaro; Nagao, Kameji; and Iwasaki, Nobuyuki, 4,052,373, Cl. 260-117.000.

Nagase, Kazuhiko; and Takakubo, Michihiko, to Japanese National Railways. Air brake system employing combined automatic and direct braking. 4,052,109, Cl. 303-25.000.

Naipawer, Richard E.; and Easter, William M., to Givaudan Corporation. 3-Methyl-5-(2,2,3-trimethylcyclopent-3-en-1-yl)pentan-2-ol compound and perfume compositions. 4,052,341, Cl. 252-522.000.

Nakada, Yutaka: *See*—
Ohama, Masanori; and Nakada, Yutaka, 4,052,712, Cl. 346-107.00R.

Nakai, Toshio: *See*—
Hanazono, Masami; Hishida, Yukio; Nakai, Toshio; Watanabe, Tomoyoshi; Hirayama, Takanobu; and Asakura, Hideo, 4,051,943, Cl. 197-151.000.

Nakamichi, Niro, to Nakamichi Research Inc. Magnetic head adjustment means for a magnetic tape machine. 4,052,745, Cl. 360-109.000.

Nakamichi Research Inc.: *See*—
Nakamichi, Niro, 4,052,745, Cl. 360-109.000.

Nakamoto, Soichi: *See*—
Ito, Tadashi; Ito, Fumio; Nakamoto, Soichi; and Isobe, Yasuo, 4,052,727, Cl. 354-29.000.

Nakamura, Tatsuji; Fukuda, Kenji; Tsuji, Toshihiko; Maruyama, Takeo; Sakai, Ryouji; Sawada, Shohei; and Miyoshi, Haruki, to Nippon Kinzoku Co., Ltd. Electric heater panel. 4,052,588, Cl. 219-345.000.

Nakaoka, Kazuhide; Araki, Kenji; Takada, Yoshikazu; Osaka, Shinobu; and Hirogami, Katsuhiko, to Nippon Kokan Kabushiki Kaisha. Method of preventing oxidation during water quenching of steel strip. 4,052,235, Cl. 148-156.000.

Nakase, Takamichi: *See*—
Hattori, Tadashi; Nakase, Takamichi; and Nishida, Minoru, 4,051,817, Cl. 123-32.0EA.

Nakayama, Eiji. Work tool. 4,051,935, Cl. 192-44.000.

Nakayama, Takao: *See*—
Inoue, Eiichi; Kokado, Hiroshi; Yamaguchi, Takashi; Tokunaga, Yukio; Nakayama, Takao; and Yamase, Toshihiro, 4,052,211, Cl. 96-35.000.

Namy, Gerald; Becker, August; and Trappe, Klaus. Method and apparatus of moistening charge material for an ore-dressing plant. 4,052,196, Cl. 75-25.000.

Nanao, Junji: *See*—
Nagano, Kentaro; Nomaki, Koji; Kutsukake, Yukinori; and Nanao, Junji, 4,052,691, Cl. 338-35.000.

Narang, Rajendra K. Segmental V belt. 4,051,740, Cl. 74-231.00C.

Narita, Koji, to Inoue Gomu Kogyo Kabushiki Kaisha. Bicycle mudguard. 4,052,522, Cl. 428-31.000.

Nash, Richard B.: *See*—
Appleby, Paul E.; Houck, Stanley J.; and Nash, Richard B., 4,052,237, Cl. 156-117.000.

National Gypsum Company: *See*—
Stiling, Rodney A., 4,052,149, Cl. 432-58.000.

National Presto Industries, Inc.: *See*—
Anderl, Richard F.; and Tienor, Lawrence J., 4,052,590, Cl. 219-438.000.

National Research Development Corporation: *See*—
Dobson, John Vincent, 4,052,285, Cl. 204-195.00G.
Gregory, Richard Langton; and Low, Ian Alexander, 4,052,571, Cl. 179-107.00R.

National Semiconductor Corporation: *See*—
Toal, Ted William; and Haines, Ralph Warren, 4,051,605, Cl. 35-30.000.
Wilcox, Milton E., 4,052,682, Cl. 332-16.00R.
Zias, Arthur R.; and Tandeske, Duane R., 4,051,712, Cl. 73-4.00R.

National Starch and Chemical Corporation: *See*—
Pastor, Stephen D.; and Skoultchi, Martin M., 4,052,527, Cl. 428-463.000.
Skoultchi, Martin M., 4,052,244, Cl. 156-310.000.

Nea-Lindberg A/S: *See*—
Kide, Leif, 4,052,177, Cl. 55-139.000.

Needham, Frederick Johnston, to McAlpine Prestcold Limited. Self-contained air-conditioning units. 4,051,693, Cl. 62-262.000.

Nemec, James: *See*—
Wade, Mark W.; and Goodrum, Donald A. (said Donald A. Goodrum assors. to), 4,051,798, Cl. 114-199.000.

Nepein, Valery Nikolaevich: *See*—
Baburin, Sergei Vyacheslavovich; Akimov, Vasily Ivanovich; Gorbushin, Vladimir Alexandrovich; Muraviev, Alexandr Petrovich; Nepein, Valery Nikolaevich; Frolov, Mikhail Vladimirovich; Aizenberg, Sergei Arnoldovich; Golovko, Evgeny Mikhailovich; Kamenev, Alexandr Fedorovich; and Sergeev, Igor Alexandrovich, 4,051,576, Cl. 19-156.000.

Neptune Dynamics Ltd.: *See*—
Hauptmann, Edward G.; and Green, John Richard, 4,051,952, Cl. 209-73.000.

Neubert, Terry C.: *See*—
Foley, Howard K.; Hutchings, David A.; and Neubert, Terry C., 4,052,547, Cl. 526-212.000.

Neukam, Theo; Bentz, Francis; and Nischk, Gunther, to Bayer Aktiengesellschaft. Acrylonitrile polymer solutions. 4,052,355, Cl. 260-30.200.

Neumaier, Hubert: *See*—
Huber, Bernd; Kleiner, Hans-Jerg; and Neumaier, Hubert, 4,052,551, Cl. 526-278.000.

Neumann, Harry: *See*—
Peddinghaus, Gunther; Neumann, Harry; and Wittenstein, Horst, 4,051,747, Cl. 76-107.00R.

New Concepts, Inc.: *See*—
Still, Robert C., 4,051,863, Cl. 137-454.200.

Newman, Gerald H.: *See*—
Shropshire, Joseph A.; and Newman, Gerald H., 4,052,539, Cl. 429-194.000.

Nicholls, Lawrence George, to Girling Limited. Vehicle suspension units. 4,052,088, Cl. 280-708.000.

Nicholson, John S.: *See*—
Adams, Stewart S.; Armitage, Bernard J.; and Nicholson, John S., 4,052,514, Cl. 424-316.000.

Nickerson, Malcolm H.; and Rinker, William R., to B. F. Goodrich Company, The. Solar powered method and apparatus for venting gaseous material from an enclosed space to atmosphere. 4,051,769, Cl. 98-43.00R.

Niebylski, Leonard M., to Ethyl Corporation. Fuel compositions and additive mixtures containing methanetricarboxylates for reducing exhaust gas catalyst plugging. 4,052,171, Cl. 44-68.000.

Niedner, Peter: *See*—
Hultsch, Gunther; Zeppenfeld, Kurt; Niedner, Peter; and Ostermeyer, Peter, 4,052,303, Cl. 210-78.000.

Nielsen, Raymond J.: *See*—
Delo, William A.; and Nielsen, Raymond J., 4,052,227, Cl. 134-56.00R.

Niemann, Helmut: *See*—
Schumacher, Peter; and Niemann, Helmut, 4,051,947, Cl. 198-478.000.

Nihon Beru-Hauetu Kabushiki Kaisha: *See*—
Ishibashi, Takao, 4,052,125, Cl. 352-29.000.

Nihon Radiator Co., Ltd.: *See*—
Ohgida, Hidetoshi; Sakai, Yoshiharu; and Kawai, Hiroyuki, 4,051,975, Cl. 220-203.000.

Nijhuis, Jan: *See*—
Terwee, Thomas Henricus Marie; and Nijhuis, Jan, 4,051,658, Cl. 57-140.0BY.

Nikitits, Edwin; and Demers, Jean C[illegible], to Markus, Franklyn M. Combined folding table and seat assem[illegible]y. 4,052,100, Cl. 297-159.000.

Niksa, Gregory J.: *See*—
Rosenthal, Isadore; Exner, Lawrence J.; Niksa, Gregory J.; Weiss, Warren I.; and Young, Maurice G., 4,052,155, Cl. 8-14.000.

Nintendo Co., Ltd.: *See*—
Ohta, Takao, 4,052,066, Cl. 273-101.100.

Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Matsui, Shigeru, 4,052,581, Cl. 200-283.000.

Nippon Kinzoku Co., Ltd.: *See*—
Nakamura, Tatsuji; Fukuda, Kenji; Tsuji, Toshihiko; Maruyama, Takeo; Sakai, Ryouji; Sawada, Shohei; and Miyoshi, Haruki, 4,052,588, Cl. 219-345.000.

Nippon Kokan Kabushiki Kaisha: *See*—
Nakaoka, Kazuhide; Araki, Kenji; Takada, Yoshikazu; Osaka, Shinobu; and Hirogami, Katsuhiko, 4,052,235, Cl. 148-156.000.
Yamagishi, Hidehisa; Tanaka, Mizuo; and Shiono, Riichi, 4,052,234, Cl. 148-156.000.

Nippon Soken, Inc.: *See*—
Hattori, Tadashi; Nakase, Takamichi; and Nishida, Minoru, 4,051,817, Cl. 123-32.0EA.

Nippon Steel Corporation: *See*—
Yoshida, Minoru; Yamaguchi, Susumu; and Hirano, Yoshihiko, 4,052,276, Cl. 204-130.000.

Nippon Telegraph and Telephone Public Corporation: *See*—
Fujimoto, Isao; Kasubuchi, Takeshi; Aiba, Masahiko; and Shimazawa, Yoichi, 4,051,945, Cl. 197-176.000.
Noda, Ken-ichi; and Saito, Shuzo, 4,052,563, Cl. 179-1.0SA.

Nippondenso Co., Ltd.: *See*—
Yoshida, Hiroshi, 4,051,822, Cl. 123-117.00D.

Nischk, Gunther: *See*—
Neukam, Theo; Bentz, Francis; and Nischk, Gunther, 4,052,355, Cl. 260-30.200.

Nishi, Akio: *See*—
Shirakawa, Seiichi; Iwahashi, Koji; Nishi, Akio; Honda, Keisuke; and Taoda, Kiyomichi, 4,052,172, Cl. 48-197.00R.

Nishida, Minoru: *See*—
Hattori, Tadashi; Nakase, Takamichi; and Nishida, Minoru, 4,051,817, Cl. 123-32.0EA.

Nishikawa, Eiichiroh; Itoh, Takuji; Maeshima, Tsugio; and Kamiyama, Setsuo, to Toa Nenryo Kogyo Kabushiki Kaisha. Catalyst for reduction of nitrogen oxides and process for preparing same. 4,052,337, Cl. 252-455.00Z.

Nishikawa, Tatsuo, to Canon Kabushiki Kaisha; and Canon Denshi Kabushiki Kaisha. Ink roller cartridge. 4,051,781, Cl. 101-348.000.

Nishio, Yasuhiro: *See*—
Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, 4,052,632, Cl. 219-137.00R.

Nishitani, Kiyoshi; Ebina, Ryuzo; Sukekawa, Ikuo; and Shintani, Shuji, to Mitsubishi Chemical Industries Ltd. Plastic pallet. 4,051,787, Cl. 108-55.300.

Nissan Motor Company, Limited: *See*—
Masaki, Kenji; and Okamura, Kenji, 4,051,672, Cl. 60-277.000.
Masaki, Kenji, 4,051,673, Cl. 60-282.000.

Masaki, Kenji, 4,051,816, Cl. 123-32.0EA.
Mita, Yasuhiro; Yamazaki, Takayuki; and Izumi, Takahisa, 4,052,166, Cl. 23-288.00F.
Oda, Takaaki, 4,051,916, Cl. 180-90.000.
Nisshin Sangyo Co., Ltd.: *See*—
Saito, Shoichi, 4,051,765, Cl. 91-35.000.
Nitro Nobel AB: *See*—
Egerstrom, Bengt Gunnar Wilhelm; and Sternhoff, Bror Lennart Teodor, 4,051,988, Cl. 226-162.000.
Nittel, Fritz: *See*—
Sobel, Johannes; Klein, Alfons; Nittel, Fritz; and Wedemeyer, Karlfried, 4,052,216, Cl. 96-84.0UV.
Nivas, Yogesh: *See*—
Jensen, Neil John; Nivas, Yogesh; and Packard, Douglas Randall, 4,052,330, Cl. 252-301.10R.
Noakes, Thomas E.: *See*—
Andrews, Richard A.; and Noakes, Thomas E., 4,051,730, Cl. 73-416.000.
Nobel Hoechst Chimie: *See*—
Christidis, Yani; Mauz, Otto; and Prinz, Eberhard, 4,052,364, Cl. 260-45.85B.
Noda, Ken-ichi; and Saito, Shuzo, to Nippon Telegraph and Telephone Public Corporation. Multiplex speech transmission system with speech analysis-synthesis. 4,052,563, Cl. 179-1.0SA.
Noguchi, Takanobu: *See*—
Yagi, Yoshiharu; Yasui, Seimei; Sato, Hiroshi; Noguchi, Takanobu; and Yamamoto, Michio, 4,052,473, Cl. 260-669.00P.
Nola, Frank J., to United States of America, National Aeronautics and Space Administration. Power factor control system for AC induction motors. 4,052,648, Cl. 318-200.000.
Nolan, John J., to Sala Magnetics, Inc. Seal assembly. 4,052,310, Cl. 210-222.000.
Nomaki, Koji: *See*—
Nagano, Kentaro; Nomaki, Koji; Kutsukake, Yukinori; and Nanao, Junji, 4,052,691, Cl. 338-35.000.
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, to Matsushita Electric Industrial Co., Ltd. Thin film magnetic head. 4,052,749, Cl. 360-123.000.
Nordentoft, Lars, to Friedrich Grohe Armaturenfabrik. Single handle mixer valve. 4,051,870, Cl. 137-636.200.
Nordgren, Hans-Elov. Loading pallet. 4,051,786, Cl. 108-51.100.
Norman, Ambrose. Attachable camp oven. 4,051,837, Cl. 126-275.00R.
North American Philips Corporation: *See*—
Haas, David J., 4,052,621, Cl. 250-458.000.
Northrop Corporation: *See*—
Garrigan, Peter P.; Gordon, Alfred A.; and Watson, Walter W., 4,052,494, Cl. 264-78.000.
Noss, William H. Seating unit. 4,052,104, Cl. 297-456.000.
Nouchi, Norimoto: *See*—
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, 4,052,749, Cl. 360-123.000.
NTN Toyo Bearing Co. Ltd.: *See*—
Tsukumo, Zenzaburo, 4,052,021, Cl. 242-130.200.
Numabe, Hitomi: *See*—
Chihara, Hiroyuki; and Numabe, Hitomi, 4,051,663, Cl. 58-26.00R.
Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., to Allied Chemical Corporation. Process for the production of chlorofluorinated acyclic hydrocarbons. 4,052,470, Cl. 260-653.700.
Nychka, Henry R.: *See*—
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,052,468, Cl. 260-648.00F.
Nyegaard, Jens. Burner head in an oil burner. 4,052,147, Cl. 431-354.000.
Nylen, Artur. Method for adjusting the tone characteristic of tone generating elements and a device therefor. 4,051,761, Cl. 84-1.150.
Oates, William L. Method and apparatus for drilling fine holes in frangible workpieces. 4,052,132, Cl. 408-1.00R.
Oberbacher, Rudolf: *See*—
Eschler, Hans; and Oberbacher, Rudolf, 4,051,582, Cl. 29-25.350.
Oce-van der Grinten N.V.: *See*—
Hectors, Adrianus M. P., 4,052,210, Cl. 96-1.50R.
O'Connor, Arthur H.; and McCullough, Robert E., to Time Computer, Inc. Solid state watch with inertial switch. 4,051,662, Cl. 58-4.00A.
Oda, Takaaki, to Nissan Motor Company, Limited. Apparatus for mounting instrument to instrument panel in motor vehicle. 4,051,916, Cl. 180-90.000.
Odstrchel, Gerald: *See*—
Hertl, William; and Odstrchel, Gerald, 4,052,504, Cl. 424-1.000.
Oetliker, Rudy: *See*—
Richardson, Bruce E.; Wilson, Gerald E.; Leseelleur, Louis A.; and Oetliker, Rudy, 4,051,958, Cl. 214-8.50C.
Ogawa, Akira: *See*—
Watanabe, Tatsuo; Saito, Hideki; Ogawa, Akira; and Yamaguchi, Masahisa, deceased, 4,052,670, Cl. 325-4.000.
Ogawa, Iwakichi, to Takara Co., Ltd. Mobile reconfigurable robot toy. 4,051,623, Cl. 46-103.000.
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Ogden, Ralph. Cutting torch and guide assembly. 4,052,040, Cl. 266-68.000.
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Ohchi, Torao: *See*—
Kotsuka, Tadashi; and Ohchi, Torao, 4,051,795, Cl. 112-153.000.
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Ohmeis, Peter M.; Gehring, Robert L.; and Hahn, Roger A., to Avon Products, Inc. Rotary filler apparatus. 4,051,878, Cl. 141-82.000.
Ohmura, Ryuichi. Line guide assembly for fishing rods. 4,051,618, Cl. 42-24.000.
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Ohrn, Gosta Arvid Valdemar, to AB Casco. Apparatus for finishing shaped articles. 4,051,635, Cl. 51-108.00R.
Ohta, Takao, to Nintendo Co., Ltd. Light-emission gun amusement machine for home use. 4,052,066, Cl. 273-101.100.
Ohtani, Tadao: *See*—
Sakamoto, Yoichi; Kato, Nobuyuki; and Ohtani, Tadao, 4,051,706, Cl. 72-253.00R.
Oishi, Yasushi; and Yoshida, Yoshinobu, to Fuji Photo Film Co., Ltd. Color diffusion transfer photographic light-sensitive material for forming both positive transfer dye images and negative dye images. 4,052,214, Cl. 96-74.000.
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Olin Corporation: *See*—
Turley, Richard J.; and Ozolins, Alexandre, 4,052,349, Cl. 260-17.200.
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Garrett, Roy Peter; Parkins, Derek Ray; Brandenstein, Manfred; and Olschewski, Armin, 4,051,937, Cl. 192-88.00A.
Olson, Robert Hutchins: *See*—
Donk, Daniel Lawrence; and Olson, Robert Hutchins, 4,051,994, Cl. 229-65.000.
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Ondetti, Miguel Angel: *See*—
Cushman, David W.; and Ondetti, Miguel Angel, 4,052,511, Cl. 424-274.000.
Oneida Electronic Mfg. Co. Inc.: *See*—
Smith, Dalton T., Sr., 4,052,689, Cl. 337-215.000.
Ono Pharmaceutical Co., Ltd.: *See*—
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Op de Beeck, Herbert Kamiel Maria, to U.S. Philips Corporation. Halogen incandescent lamp. 4,052,637, Cl. 313-222.000.
Oppelt, John Christian: *See*—
Susi, Peter Vincent; and Oppelt, John Christian, 4,052,361, Cl. 260-45.80N.
Optilon W. Erich Heilmann GmbH: *See*—
Heimberger, Helmut, 4,051,579, Cl. 24-205.16R.
Orange Products, Inc.: *See*—
Gentile, Charles J., 4,051,974, Cl. 215-329.000.
Orfeo, Sabatino R.: *See*—
Mears, Whitney H.; and Orfeo, Sabatino R., 4,052,555, Cl. 174-17.0GF.
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Hopfner, Clemens; and Ort, Wolfgang, 4,052,726, Cl. 354-29.000.
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Oshima, Kenji, to Kabushiki Kaisha Seikosha. Gear mechanism for preventing reverse rotation. 4,051,744, Cl. 74-437.000.
Ostermeyer, Peter: *See*—
Hultsch, Gunther; Zeppenfeld, Kurt; Niedner, Peter; and Ostermeyer, Peter, 4,052,303, Cl. 210-78.000.
Ostrowski, Alfred R.: *See*—
Murphy, Francis T.; Sagan, Peter; Rosenthal, Martin B.; and Ostrowski, Alfred R., 4,051,939, Cl. 194-10.000.
Otis Engineering Corporation: *See*—
Amancharla, Amareswar; and Young, Carter R., 4,051,896, Cl. 166-123.000.
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Wahlen, Antonius; and Otten, Klaus-Detlef, 4,051,651, Cl. 57-35.000.
Overdurf, John C., Jr.: *See*—
Leprohon, Louis C., Jr.; and Overdurf, John C., Jr., 4,051,661, Cl. 57-148.000.
Owens-Corning Fiberglas Corporation: *See*—
Costin, Darryl J., 4,052,339, Cl. 252-512.000.
Cunningham, Cecil R.; and Symborski, Alex P., 4,052,016, Cl. 242-18.00G.
Detonnancourt, Maurice J., 4,051,873, Cl. 139-440.000.
Hand, Ronnie D.; Chappelear, Robert N.; and Mueller, Dale R., 4,052,015, Cl. 242-18.00G.
Hill, Homer G.; and Austin, Kenneth L., 4,052,257, Cl. 162-156.000.
Renaud, Laurent C.; and Charon, Clarence W., 4,052,256, Cl. 162-145.000.
Stalego, Joseph P.; and Rigby, William H., Jr., 4,052,182, Cl. 65-3.00C.
Owens-Illinois, Inc.: *See*—
Gray, Don N.; and Guilbault, George G., 4,052,286, Cl. 204-195.00R.
Ozolins, Alexandre: *See*—
Turley, Richard J.; and Ozolins, Alexandre, 4,052,349, Cl. 260-17.200.
P.E.I. Incorporated: *See*—
Baum, Werner, 4,051,909, Cl. 175-93.000.
P. R. Mallory & Co. Inc.: *See*—
Mallory, Henry Rogers, 4,052,537, Cl. 429-174.000.
Pacific Kogyo Kabushiki Kaisha: *See*—
Ohama, Masanori; and Nakada, Yutaka, 4,052,712, Cl. 346-107.00R.
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Jensen, Neil John; Nivas, Yogesh; and Packard, Douglas Randall, 4,052,330, Cl. 252-301.10R.
Pagen, Charles A.: *See*—
Cushman, Donald R.; Pagen, Charles A.; Schick, John W.; and Yan, Tsoung-Yuan, 4,052,290, Cl. 208-6.000.
Paillaud, Pierre; and Raymond, Joel. Method and apparatus for improving the energy yield of a reaction. 4,052,139, Cl. 431-2.000.
Pain, David Lord: *See*—
Broughton, Barbara Joyce; Large, Bryan John; Marshall, Stuart Malcolm; Pain, David Lord; and Wooldridge, Kenneth Robert Harry, 4,052,390, Cl. 544-118.000.
Palnik, Karl, to Carolinch Company, The. Filtering equipment. 4,052,317, Cl. 210-323.00T.
Pandel-Bradford, Inc.: *See*—
Kapasi, Vikram C.; Lasman, Henry R.; Lebenson, Robert J.; and Wisotzky, Reuben, 4,052,236, Cl. 156-85.000.
Pantel, Howard W., Jr.: *See*—
Mojden, Wallace W.; Davila, Jose E.; Hooper, George W.; Kwiatkowski, Gerald M.; and Pantel, Howard W., Jr., 4,051,965, Cl. 214-16.40A.
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Papenfuhs, Theodor, to Hoechst Aktiengesellschaft. Process for preparing aromatic hydroxy-carboxylic acid alkyl esters. 4,052,438, Cl. 560-61.000.
Papenmeier, Horst. Inspection glass light. 4,052,608, Cl. 362-368.000.
Paper Converting Machine Company: *See*—
Shirasaka, Fumitake, 4,052,048, Cl. 270-40.000.
Parfitt, Norman Leslie Cyril, to Coal Industry (Patents) Limited. Non return device. 4,051,929, Cl. 188-196.00C.
Parker, Ian David: *See*—
Ells, John William; and Parker, Ian David, 4,051,688, Cl. 61-110.000.
Parker Manufacturing Company: *See*—
Goodchild, Harry M., 4,051,991, Cl. 227-155.000.
Parker, Stephen D.: *See*—
Bao, Frank W.; Hummeldorf, James L.; and Parker, Stephen D., 4,051,713, Cl. 73-9.000.
Parkins, Derek Ray: *See*—
Garrett, Roy Peter; Parkins, Derek Ray; Brandenstein, Manfred; and Olschewski, Armin, 4,051,937, Cl. 192-88.00A.
Partners Limited, The: *See*—
Turpin, Raymond C., Jr., 4,052,220, Cl. 106-90.000.
Parups, Eriks, to Pitney-Bowes, Inc. Container loading system. 4,051,957, Cl. 214-6.00H.
Pashley, Richard D., to Intel Corporation. Process for preparing a substrate for MOS devices of different thresholds. 4,052,229, Cl. 148-1.500.
Passavant-Werke Michelbacher Hutte: *See*—
Busse, Oswald; and Klesper, Hugo, 4,052,314, Cl. 210-230.000.
Pastor, Sheldon Lee; Erickson, Milton E.; and Kahn, Donald D., to Minnesota Mining and Manufacturing Company. Magnetic tape recorder drive mechanism having a latching member with a pause mode and a stop mode. 4,052,742, Cl. 360-96.000.
Pastor, Stephen D.; and Skoultchi, Martin M., to National Starch and Chemical Corporation. Radiation polymerized hot melt pressure sensitive adhesives. 4,052,527, Cl. 428-463.000.
Patterson, Colin Davey. Data transmission system. 4,052,558, Cl. 178-68.000.
Patton, Michael C.: *See*—
Freeman, David Bruce; Patton, Michael C.; and Dragan, Carl F., 4,051,569, Cl. 12-146.0CK.
Patzner, Alfred, to Hoechst Aktiengesellschaft. Plastic vacuum suction funnel. 4,052,163, Cl. 23-259.000.
Paul, James E.; and Vitols, Visvaldis A., to Rockwell International Corporation. Noise filtering device. 4,052,559, Cl. 179-1.00P.
Pauly, Peter Daniel: *See*—
Rudner, Bernard; and Pauly, Peter Daniel, 4,052,346, Cl. 260-2.5AM.
Pearsall Chemical Corporation: *See*—
Pearsall, Mason P., 4,052,471, Cl. 260-660.000.
Pearsall, Mason P., to Pearsall Chemical Corporation. Process for chlorinating C_8 to C_{30} linear hydrocarbons. 4,052,471, Cl. 260-660.000.
Peddinghaus, Gunther; Neumann, Harry; and Wittenstein, Horst, to A.G. fur industrielle Elektronik AGIE Losone b. Loc. no. Method for making a tool electrode for electrical discharge machining. 4,051,747, Cl. 76-107.00R.
Pedlik, Miroslav: *See*—
Reichrt, Vaclav; Smalek, Josef; Pedlik, Miroslav; and Alexa, Miloslav, 4,052,151, Cl. 432-115.000.
Peerless Industries Inc.: *See*—
Caliri, Frank, 4,051,783, Cl. 104-151.000.
Peet, Norton P.; and Sunder, Shyam, to Dow Chemical Company, The. Certain N-(2-hydroxyethyl)heteroiminocarboxamides. 4,052,385, Cl. 260-239.0BF.
Pelzel, Erich: *See*—
Groth, Volker; Stradmann, Adolf; and Pelzel, Erich, 4,051,887, Cl. 164-76.000.
Pendleton, Robert G.: *See*—
Kaiser, Carl; Pendleton, Robert G.; and Setler, Paulette E., 4,052,506, Cl. 424-244.000.
Pennell, Anthony Robin; Dover, Peter Leslie; and Davies, William Martin, to Associated Portland Cement Manufacturers Limited, The. Integrated reaction process. 4,052,148, Cl. 432-1.000.
Pennwalt Corporation: *See*—
McKellin, Wilbur H.; Mageli, Orville L.; and D'Angelo, Antonio Joseph, 4,052,543, Cl. 526-48.000.
Penque, Ronald A., to Biocel Corporation. Fibering system and apparatus. 4,052,009, Cl. 241-1.000.
PepsiCo Inc.: *See*—
Homanick, George, 4,051,969, Cl. 214-516.000.
Performance Industries, Inc.: *See*—
Boyesen, Eyvind, 4,051,820, Cl. 123-73.00A.
Perkin-Elmer Corporation, The: *See*—
Atwood, John G.; Marshall, Hamilton W., Jr.; and Heinz, Peter H., 4,052,161, Cl. 23-230.00R.
Higham, Peter; and Hoult, Robert Alan, 4,052,661, Cl. 324-.50R.
Perry, Walter Merton. Container with attached closure. 4,051,976, Cl. 220-269.000.
Peters, Alan W.: *See*—
Ireland, Henry R.; Peters, Alan W.; and Stein, Thomas R., 4,052,477, Cl. 260-676.00R.
Peters, Charles Allan, to IMC Chemical Group, Inc. Cis-zearalanone, cis-zearalenol, and cis-zearalene. 4,052,414, Cl. 260-343.410.
Peterson, Dean M., to Honeywell Inc. Electrographic recording head having an integral recording electrode cleaning means. 4,052,714, Cl. 346-155.000.
Peterson, Harold Severin, to Applied Power Inc. Curing rim. 4,051,881, Cl. 144-288.00A.
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., to Allied Chemical Corporation. Process for the production of chlorofluorinated cycloaliphatic hydrocarbons. 4,052,468, Cl. 260-648.00F.
Petry, Stanton H., to Cory Food Services, Inc. Lime breakup means. 4,051,839, Cl. 126-344.000.
Pews, R. Garth: *See*—
Mixan, Craig E.; and Pews, R. Garth, 4,052,394, Cl. 260-250.0BC.
Pfizer Inc.: *See*—
Wiedermann, Hans E., 4,052,507, Cl. 424-251.000.
Pflaum, William D.; and Tullis, Mark E., to Mazer Corporation, The. Roller device for use with pressure sensitive duplicating master and method of operation. 4,051,778, Cl. 101-133.000.
Phillips Petroleum Company: *See*—
Dix, James S.; and Mathis, Ronald D., 4,052,351, Cl. 260-23.00H.
Hawkins, Harold M., deceased, 4,052,478, Cl. 260-681.000.
Hutson, Thomas, Jr.; and Carter, Cecil O., 4,052,469, Cl. 260-653.600.
Marrs, Oren L.; Reusser, Robert E.; and Tieszen, Dale O., 4,052,219, Cl. 106-14.000.
Miller, J. B., 4,051,717, Cl. 73-46.000.
Mills, King L.; and Denton, Roy V., 4,052,467, Cl. 260-638.00B.
Smith, Ernest L., 4,051,951, Cl. 206-508.000.
Phillips, Wayne E.; and Scheuermann, Glen R., to Airco, Inc. Rotating shaft coupling for use in vacuum. 4,051,695, Cl. 64-8.000.
Phillips, William: *See*—
Williams, Brown F.; Burke, William Joseph; Phillips, William; and Staebler, David Lloyd, 4,052,119, Cl. 350-3.500.
Piacentino, Raymond C. Game apparatus. 4,052,068, Cl. 273-122.00R.
Picker Corporation: *See*—
Brunnett, Carl J., 4,052,620, Cl. 250-445.00T.
Pierce, Robert M., to United Technologies Corporation. Suction vent at recirculation zone of combustor. 4,051,670, Cl. 60-39.72R.
Pietsch, Hartmut; Clauss, Karl; Jensen, Harald; and Schmidt, Erwin, to Hoechst Aktiengesellschaft. Process for preparing acetoacetamide-N-sulfofluoride. 4,052,453, Cl. 260-543.00F.

Pietzner, Jurgen R., to Kohler General, Inc. Core molding machine. 4,052,137, Cl. 425-577.000.
Pifferi, Marc Laurent, to Mahay & Cie. Total prosthesis of the hip. 4,051,559, Cl. 3-1.912.
Pilkington Brothers Limited: *See*—
Rhodes, William Jackson, 4,052,186, Cl. 65-137.000.
Pinckney, Cheryl. Oven rack. 4,051,838, Cl. 126-340.000.
Pirnie, Robert M., III, to Communication Equipment & Contracting Co., Inc. Emergency call answering system. 4,052,569, Cl. 179-27.0FH.
Pitney-Bowes, Inc.: *See*—
Mersereau, Robert E.; and Silverman, Harold, 4,052,051, Cl. 271-94.000.
Parups, Eriks, 4,051,957, Cl. 214-6.00H.
Tiggelers, Hubertus H.; and Chlod, Martinus P., 4,051,986, Cl. 226-114.000.
Piuk, Peter: *See*—
Meckl, Ferenc; and Piuk, Peter, 4,051,718, Cl. 73-71.200.
Pixley Richards West, Inc.: *See*—
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Pizzini, Louis C.: *See*—
Austin, Arthur L.; Levis, William W., Jr.; Pizzini, Louis C.; and Hartman, Robert J., 4,052,345, Cl. 260-2.5AP.
Plaiss, Charles E. Bicycle lock. 4,051,703, Cl. 70-371.000.
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Plastronics, Inc.: *See*—
Manschot, James G.; Mather, Byron L.; and Balistreri, Thomas W., 4,051,578, Cl. 251-4.000.
Plempel, Manfred: *See*—
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Plessey Handel und Investments A.G.: *See*—
Fairholme, Russel John, 4,052,708, Cl. 340-174.0TF.
Martin, Barrie James; and Bridger, Victor Ernest, 4,052,004, Cl. 239-102.000.
Plewes, John Travis, to Bell Telephone Laboratories, Incorporated. Quaternary spinodal copper alloys. 4,052,204, Cl. 75-154.000.
Plough, Inc.: *See*—
Kaplan, Carl, 4,052,513, Cl. 424-310.000.
Pociask, Joseph R., to Ciba-Geigy Corporation. Process for the production of 2-alkyl or 2-cycloalkyl-4-methyl-6-hydroxypyrimidines. 4,052,396, Cl. 260-251.00R.
Pohjola, Jorma Toivo Tapani. Endless track vehicle having a steerable end and method for operating the same. 4,051,914, Cl. 180-9.440.
Pohl, Jens G.: *See*—
United States of America, National Aeronautics and Space Administration; Miller, Charles G.; and Pohl, Jens G., 4,051,834, Cl. 126-271.000.
Pohl, Leonard Buster. Circuit monitor to determine power on and circuit working. 4,052,664, Cl. 324-51.000.
Polaroid Corporation: *See*—
Douglas, Lawrence M., 4,052,729, Cl. 354-86.000.
Hendry, Donald H.; and Johnson, Bruce K., 4,052,728, Cl. 354-86.000.
Polk, Donald E.; Ray, Ranjan; and Davis, Lance A., to Allied Chemical Corporation. Amorphous alloys with improved resistance to embrittlement upon heat treatment. 4,052,201, Cl. 75-124.000.
Polster, Herbert: *See*—
Speth, Winfried; Dreiseitl, Walter; Bohm, Klaus; Schleicher, Lothar; and Polster, Herbert, 4,052,642, Cl. 318-561.000.
Polychrome Corporation: *See*—
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Polymer Processing Research Institute Ltd.: *See*—
Yazawa, Masahide; Tani, Haruhisa; Matsumoto, Masaki; and Sasaki, Yasuo, 4,052,242, Cl. 156-265.000.
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Polysar Limited: *See*—
Wei, Yung-Kang; and Lobos, Zbigniew Jack, 4,052,542, Cl. 526-46.000.
Poncy, Mark P.; and Poncy, Richard P. Catheter feeding system. 4,051,849, Cl. 128-214.400.
Poncy, Richard P.: *See*—
Poncy, Mark P.; and Poncy, Richard P., 4,051,849, Cl. 128-214.400.
Ponticello, Gerald S.: *See*—
Anderson, Paul S.; Christy, Marcia E.; and Ponticello, Gerald S., 4,052,508, Cl. 424-258.000.
Ponzini, Sandro: *See*—
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Port, John H.: *See*—
Hueschen, Robert E.; and Port, John H., 4,052,640, Cl. 313-330.000.
Porth, Frank L.: *See*—
Black, James A.; Farwell, Harry Russell; and Porth, Frank L., 4,051,777, Cl. 101-123.000.
Post, Roger L.: *See*—
Shoop, John C.; Post, Roger L.; and Herschler, Michael G., 4,052,135, Cl. 417-295.000.
Potts, Robert G. Cone labeling, separating and restacking apparatus. 4,052,250, Cl. 156-556.000.
Powell, James E., to Shell Oil Company. 3-Acetyltetrahydro-2-(nitromethylene)-2H-1,3-thiazine. 4,052,388, Cl. 544-54.000.
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French, Tom; Edwards, Reginald Harold; and Powell, Leslie Vernon, 4,051,885, Cl. 152-330.00L.
Powers, Robert H., to Itek Corporation. Cassette-like device for advancing and withdrawing a predetermined length of film to and from a camera. 4,052,731, Cl. 354-275.000.
PPG Industries, Inc.: *See*—
Briody, Robert G., 4,052,443, Cl. 260-502.00R.
Kolakowski, Anthony, 4,052,185, Cl. 65-106.000.
Seymour, Samuel L., 4,052,188, Cl. 65-273.000.
Pratt, Richard D.; Proffitt, Paul F.; and Webb, George, to General Electric Company. Intumescent fire retardant material and article. 4,052,526, Cl. 428-447.000.
Prazak, Charles J., III, to Zenith Radio Corporation. Non-settling process for coating a phosphor slurry on the inner surface of a cathode ray tube faceplate. 4,052,519, Cl. 427-68.000.
Prestele, Karl: *See*—
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Preuss, Robert K.: *See*—
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Priddy, Duane B., to Dow Chemical Company, The. Process for the manufacture of di-t-butylperoxy ketals. 4,052,464, Cl. 260-610.00C.
Prince Corporation: *See*—
Marcus, Konrad H., 4,052,124, Cl. 350-304.000.
Principe, Pacifico A.: *See*—
Stiller, Eric T.; Levine, Seymour D.; Principe, Pacifico A.; and Diassi, Patrick A., 4,052,436, Cl. 560-52.000.
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Christidis, Yani; Mauz, Otto; and Prinz, Eberhard, 4,052,364, Cl. 260-45.85B.
Pritchard, Edwin J., to Western Electric Company, Inc. Article mounting adhesive. 4,052,221, Cl. 106-270.000.
Proctor & Gamble Company, The: *See*—
McDermott, James A.; Anderson, Robert L.; and Loomans, Maurice E., 4,052,515, Cl. 424-343.000.
Youngquist, Rudolph William, 4,052,517, Cl. 426-302.000.
Product Explorations Incorporated: *See*—
Casavant, Roger M., 4,052,062, Cl. 273-74.000.
Production Specialties, Inc.: *See*—
Embree, Hugh D., 4,051,895, Cl. 166-117.500.
Produits Chimiques Ugine Kuhlmann: *See*—
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Progressive Equipment, Inc.: *See*—
Swanson, Kenneth P., 4,051,577, Cl. 19-291.000.
Prokop, Alexander: *See*—
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Griesemer, Douglas Earl, 4,052,725, Cl. 354-1.000.
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Lockwood, Harry Francis; and Ettenberg, Michael, 4,052,252, Cl. 156-622.000.
Ross, Walter Lee, 4,052,721, Cl. 343-6.5LC.
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Tuma, Alois Vaclav; and Schiess, Jorg, 4,052,626, Cl. 307-271.000.
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Paul, James E.; and Vitols, Visvaldis A., 4,052,559, Cl. 179-1.00P.
Ries, Donald Lloyd, 4,051,784, Cl. 105-131.000.

Rodriquez, Jose. Projectile catapult and bat toy. 4,052,065, Cl. 273-95.00F.

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Rosenthal, Isadore; Exner, Lawrence J.; Niksa, Gregory J.; Weiss, Warren I.; and Young, Maurice G., 4,052,155, Cl. 8-14.000.

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ROJ Electrotex S.p.A.: *See—*
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Rolls, George Henry, to Rolls, John, a part interest. Material recovery systems. 4,052,313, Cl. 210-242.0AS.
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Rolls, George Henry, 4,052,313, Cl. 210-242.0AS.
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Roman, Steven A., to Shell Oil Company. Esters of derivatives of 2-imidazolidinylideneniroacetic acid. 4,052,411, Cl. 548-342.000.
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Roskott, Lodewijk; and Schroeder, Arnold, to Akzona, Incorporated. Preparation of organic peroxides. 4,052,465, Cl. 260-610.00R.
Ross, Edward Alan, to Liquid Carbonic Canada Ltd. Saturated liquid/-vapor generating and dispensing. 4,051,886, Cl. 164-16.000.
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Ross, Walter Lee, to RCA Corporation. Multi-target tracker for tracking near co-range targets. 4,052,721, Cl. 343-6.5LC.
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Russell, Charles R. Optical concentrator and cooling system for photovoltaic cells. 4,052,228, Cl. 136-89.0PC.
Russell, Owen Clarkson, to Brunswick Corporation. Operating handle for pivotally mounted trolling motor. 4,051,802, Cl. 115-17.000.
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Sanders, Harold D.; and Landreth, Thomas C., to Central Welding Supply Co., Inc. Swivel connector for an arc gouging torch. 4,052,116, Cl. 339-8.00R.
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Sandviknes, Jan, 4,052,143, Cl. 431-215.000.
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Scanley, Clyde S. Dispersions of water soluble polymers in oil. 4,052,353, Cl. 260-29.6PM.
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Schawlow, Arthur L.; and Kowalski, Frank V., to Leland Stanford Junior University, Board of Trustees of. Method of and apparatus for measuring the wavelength of a source of radiant energy. 4,052,129, Cl. 356-106.00R.
Scheingold, William Samuel; and Youngfleish, Frank Christian, to AMP Incorporated. Contact carrying spring member. 4,052,118, Cl. 339-17.0CF.
Schellens, Eugene Peter, to South Cove Corporation, Inc. Heating stove. 4,051,831, Cl. 126-76.000.
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Scheuermann, Glen R.: *See*—
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Schick, John W.: *See*—
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Schloss, Alden. Hand-held anemometer. 4,051,725, Cl. 73-228.000.
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Rau, Rama N., 4,052,662, Cl. 324-6.000.
Schmalz, Peter Joseph, to RCA Corporation. Helical resonator. 4,052,684, Cl. 333-82.00R.
Schmidt, Erwin: *See*—
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Schneiderman, Max, to IPCO Hospital Supply Corporation, Whaledent International Division. Electrosurgical unit. 4,051,855, Cl. 128-303.140.
Schoellen, Joseph: *See*—
Albareda, Angel Ramon Terrado; and Schoellen, Joseph, 4,052,246, Cl. 156-412.000.
Schoeman, Marthinus Johannes. Supplying fuel to internal combustion engines. 4,052,488, Cl. 261-18.00A.
Schoenafinger, Eduard; and Leutner, Bernd, to BASF Aktiengesellschaft. Manufacture of γ-iron(III) oxide. 4,052,326, Cl. 252-62.560.
Schoeneweis, E. Frederick: *See*—
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Schrider, Michael Stanley; and Levy, Stephen David, to American Cyanamid Company. Substituted phosphorothioic acid and method of use in siphonaptera compositions in warm-blooded animals. 4,052,381, Cl. 260-206.000.
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Schulz, J. Gustav; and Sabourin, Edward T., to Gulf Research & Development Company. Organic acids and process for preparing same. 4,052,448, Cl. 260-515.00H.
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Schumann, Bernard Roy: *See*—
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Schwan, Thomas J., to Morton-Norwich Products, Inc. 1-[2-(Hexahydro-1H-azepino)ethyl]-2(1H)pyrimidone dihydrochloride. 4,052,399, Cl. 260-256.40C.
Schwan, Thomas J., to Morton-Norwich Products, Inc. Hypertensive 1-substituted 2(1H)-pyrimidones. 4,052,400, Cl. 260-256.40C.
Schwartz, Edwin L., to Rite Autotronics Corporation. Moisture meter construction. 4,052,667, Cl. 324-65.00P.
Schwartz, Michael G.; Lorentzen, Alan P.; and Bucheck, David J., to Minnesota Mining and Manufacturing Company. Oil sweep. 4,052,306, Cl. 210-242.00S.
Schwartz, Osten; and Vukotic, Milos, to Aktiebolaget Electrolux. Liquid mixture indicator for rug shampoo apparatus. 4,051,727, Cl. 73-306.000.
Schwartz, Robert E.: *See*—
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Simnovec, Andre; Wiebe, Martin; and Berndt, Willi, 4,052,652, Cl. 318-476.000.
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Scribner, Albert W. High speed stock feeder for punch presses and the like. 4,051,987, Cl. 226-115.000.
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Seeburg Corporation, The: *See—*
Murphy, Francis T.; Sagan, Peter; Rosenthal, Martin B.; and Ostrowski, Alfred R., 4,051,939, Cl. 194-10.000.
Segal, Jack S.; and Trapp, Harold D., to Atlantic Richfield Company. Flow responsive counting apparatus. 4,051,724, Cl. 73-198.000.
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Sekera, George F., Jr.; and Cousins, Otto J., to Harper-Wyman Company. Infinite switch and indicator. 4,052,591, Cl. 219-506.000.
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Sekmakas, Kazys, to DeSoto, Inc. High solids coating compositions containing liquid bishydroxy propyl ether of a bisphenol. 4,052,480, Cl. 260-856.000.
Sera, Hidefumi; Yamamoto, Nobuo; Horie, Ikutaro; Nagao, Kameji; and Iwasaki, Nobuyuki, to Fuji Photo Film Co., Ltd. Process for hardening gelatin. 4,052,373, Cl. 260-117.000.
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Shaddix, Billy Joe. Alignment of flanges. 4,052,045, Cl. 269-43.000.
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Sharp, Peter A. Free flying aerodynamic toy with high stability. 4,051,622, Cl. 46-74.00R.
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Riesser, Gregor H., 4,052,338, Cl. 252-470.000.
Roman, Steven A., 4,052,411, Cl. 548-342.000.
Shepard, Marshall Howard, to Gillette Company, The. Ground fault interrupter circuit. 4,052,751, Cl. 361-50.000.
Sherman, Charles F., to Unican Security Systems, Ltd. Key cutting machine for producing obliquely oriented bitting. 4,051,748, Cl. 76-110.000.
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Shirasaka, Fumitake, to Paper Converting Machine Company. Longitudinally interfolding device and method. 4,052,048, Cl. 270-40.000.
Shoaf, Walter D. Pivotal support. 4,051,953, Cl. 211-119.100.
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Shropshire, Joseph A.; and Newman, Gerald H., to Exxon Research and Engineering Company. Electrochemical cell with a grahite intercalation compound cathode. 4,052,539, Cl. 429-194.000.
Shuey, Kenneth C., to Westinghouse Electric Corporation. DC series voltage regulator with gating means for output to remain off until regulation level is reached. 4,052,660, Cl. 323-19.000.
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Siegfried, Jack. Travel game. 4,052,071, Cl. 273-134.0AC.
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Sinkovec, Andrej, to Friedrich Frech. Beam compass. 4,051,599, Cl. 33-27.00C.
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Smatko, Joseph S., to McDonnell Douglas Corporation. Substantially non-gassing alkali resistant battery separator and method of producing same. 4,052,540, Cl. 429-229.000.

Smith, Arthur C. Starting apparatus for rodeo events. 4,051,811, Cl. 119-15.50A.

Smith, Dalton T., Sr., to Oneida Electronic Mfg. Co. Inc. Wire spring fuse holder with pigtail leads. 4,052,689, Cl. 337-215.000.

Smith, Ernest L., to Phillips Petroleum Company. Package having means for providing coaxial alignment in a stack thereof. 4,051,951, Cl. 206-508.000.

Smith, James M., to United States of America, Army. Pneumatic servo system utilizing heat squib and explosive valve. 4,051,979, Cl. 222-3.000.

Smith, James M., to United States of America, Army. Pneumatic gear motor application. 4,052,024, Cl. 244-3.210.

Smith, Kay D.; Bachass, Arjun S.; and Black, Francis B., to Kenway Incorporated. Circuit for interfacing microcomputer to peripheral devices. 4,052,702, Cl. 364-200.000.

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Sneer, Meer. Dental implants. 4,051,598, Cl. 32-10.00A.

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Spaeth, Claus; Wilhelm, Gunter; and Hammel, Ingeborg, to Villeroy & Boch Keramische Werke KG. Apparatus for producing glass parison by the press-and-blow process. 4,052,187, Cl. 65-160.000.

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Speth, Winfried; Dreiseitl, Walter; Bohm, Klaus; Schleicher, Lothar; and Polster, Herbert, to Siemens Aktiengesellschaft. Apparatus for controlling controlled systems with dead time. 4,052,642, Cl. 318-561.000.

Spiegelman, Gerald H.: *See—*
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Spitz, Erich; d'Auria, Luigi; and Huignard, Jean-Pierre, to Thomson-CSF. System for reading an optical recording of binary numerical data. 4,052,706, Cl. 340-173.0LM.

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Spratt, Robert B.: *See—*
Sarem, Amir M.; Darr, Russell C.; Elchlepp, Dale L.; and Spratt, Robert B., 4,051,901, Cl. 166-270.000.

Spurlock, James W.: *See—*
Murphy, Robert P.; and Spurlock, James W., 4,052,613, Cl. 250-259.000.

Staebler, David Lloyd: *See—*
Williams, Brown F.; Burke, William Joseph; Phillips, William; and Staebler, David Lloyd, 4,052,119, Cl. 350-3.500.

Staff, Finn; and Svensson, Christer, to Linjegods A/S; and Lagaholm AB. System for handling goods on carriers for combined railway and overland transportation. 4,051,959, Cl. 214-38.0BA.

Stafford, Donald Claude, to Chicago Bridge & Iron Company. Multiport swivel joint. 4,052,090, Cl. 285-61.000.

Stahlin, Walter: *See—*
Borer, Werner J.; Kugler, Tibor; Schmidt, Walter; and Stahlin, Walter, 4,052,153, Cl. 432-156.000.

Stahlwerke Peine-Salzgitter AG: *See—*
Brotzmann, Karl; Knuppel, Helmut; Rheinlander, Paul; and Mahn, Gustav, 4,052,197, Cl. 75-60.000.
Rheinlander, Paul; Mahn, Gustav; Schulz, Klaus, deceased; Ruhland, Ingrid, legal representative; and Berner, Klaus, 4,052,043, Cl. 266-207.000.

Stalego, Joseph P.; and Rigby, William H., Jr., to Owens-Corning Fiberglas Corporation. Process for producing air blown glass fiber strand mat. 4,052,182, Cl. 65-3.00C.

Stamicarbon B.V.: *See—*
Klein, Joseph F. M.; Stijfs, Petrus A. M. J.; and Thoma, Jozef A., 4,052,458, Cl. 260-586.00C.
van Montfoort, Abraham; and Scholten, Joseph J. F., 4,052,336, Cl. 252-447.000.

Stanaback, Robert J., to Tenneco Chemicals, Inc. Process for the production of vinyl halide polymers. 4,052,546, Cl. 526-206.000.

Stanaback, Robert J., to Tenneco Chemicals, Inc. Process for the polymerization of vinyl halides in the presence of an alkylene bis-(mercaptoalkanoate). 4,052,548, Cl. 526-214.000.

Standard-Messo Duisburg Gesellschaft Fuer Chemietechnik mit Beschraenkter Haftung & Co.: *See—*
Messing, Theodor; and Wamser, Karl H., 4,052,261, Cl. 195-36.00R.

Standard Oil Company, The: *See—*
Suresh, Dev D.; Bremer, Noel J.; and Grasselli, Robert K., 4,052,418, Cl. 260-346.740.

Standard Oil Company (Indiana): *See—*
Murphy, Robert P.; and Spurlock, James W., 4,052,613, Cl. 250-259.000.

Stanish, Ronald J., to AMF Incorporated. Momentary contact pushbutton type switch having flexible, mounted housing. 4,052,580, Cl. 200-159.00R.

Stankevich, Paul Alexandrovich: *See—*
Giller, Solomon Aronovich; Venter, Karl Karlovich; Trushule, Margarita Aldonovna; Berggrin, Guntis Erikovich; Brinkmanis, Robert Avgustovich; Mikstais, Uldis Yanovich; and Stankevich, Paul Alexandrovich, 4,052,419, Cl. 260-347.400.

Stanland, Jackson E.: *See—*
Lin, Yeong S.; and Stanland, Jackson E., 4,052,711, Cl. 340-174.0TF.

Starr, David G., to Tally Corporation. Capstan driven, endless printer ribbon cartridge. 4,051,944, Cl. 197-168.000.

Staton, Lynn D. Milling roll. 4,051,773, Cl. 99-622.000.

Stauffer Chemical Company: *See—*
Baker, Don R.; and Walker, Francis H., 4,052,432, Cl. 260-465.00D.
Lerner, Robert Wendell; Towers, Russell S.; and Flasch, John Robert, 4,052,428, Cl. 260-448.0AD.
Uhing, Eugene H.; and Toy, Arthur D. F., 4,052,463, Cl. 260-606.50P.
Weil, Edward D., 4,052,158, Cl. 8-116.00P.

Steel, Francis Robert: *See—*
Enderby, Ralph Thomas; Steel, Francis Robert; and Victor, Alan Michael, 4,052,672, Cl. 325-147.000.

Steffen, Ronald W., to Dickey-john Corporation. Liquid spreader control system. 4,052,003, Cl. 239-71.000.

Stein, Thomas R.: *See—*
Ireland, Henry R.; Peters, Alan W.; and Stein, Thomas R., 4,052,477, Cl. 260-676.00R.

Steine, Hans T.; Simm, Wolfgang; and Quaas, Joseph F., to Eutectic Corporation. Indium-containing silver-copper-zinc brazing alloy. 4,052,531, Cl. 428-673.000.

Steinfeld, Carolyn VeAlletto, to Lawrence Peska Assoc., Inc., a part interest. Pill and water dispenser. 4,051,977, Cl. 221-96.000.

Steinthal, Pierre T., to Compagnie Nationale Air France. Central arm rest for a complex of at least two seats. 4,052,103. Cl. 297-417.000.

Stelzer, William. Solar heating panel. 4,051,832, Cl. 126-270.000.

Stenhall, Turo. Apparatus for manufacturing slide fastener filament. 4,052,145, Cl. 425-392.000.

Stepan Chemical Company: *See—*
Baker, Thomas G.; and Shute, Raymond J., 4,052,431, Cl. 260-513.00T.

Sterigard Corporation: *See—*
Bruce, Roger K.; and Marhold, Werner, 4,052,249, Cl. 156-513.000.

Sterling Drug Inc.: *See—*
Diana, Guy D., 4,052,382, Cl. 260-239.0BE.

Sternberg, Ernest M., to Monsanto Company. Extrusion pack for sheath-core filaments. 4,052,146, Cl. 425-463.000.

Sternhoff, Bror Lennart Teodor: *See—*
Egerstrom, Bengt Gunnar Wilhelm; and Sternhoff, Bror Lennart Teodor, 4,051,988, Cl. 226-162.000.

Sternlicht, Mark, to Wonder Corporation of America. Flashlight case assembly and flashlight. 4,052,610, Cl. 362-200.000.

Stetson, Harold M., to Martin Engineering Company. Fast release aerator for materials handling. 4,051,982, Cl. 222-195.000.

Stewart, Samuel F. Racket weighting means. 4,052,061, Cl. 273-73.00R.

Stijfs, Petrus A. M. J.: *See—*
Klein, Joseph F. M.; Stijfs, Petrus A. M. J.; and Thoma, Jozef A., 4,052,458, Cl. 260-586.00C.

Stiling, Rodney A., to National Gypsum Company. Continuous calciner. 4,052,149, Cl. 432-58.000.

Still, Robert C., to New Concepts, Inc. Gate valve with replaceable liner. 4,051,863, Cl. 137-454.200.

Stiller, Eric T.; Levine, Seymour D.; Principe, Pacifico A.; and Diassi, Patrick A., to E. R. Squibb & Sons, Inc. Fluorene-2-acetic acids and derivatives, process and method of using. 4,052,436, Cl. 560-52.000.

Stoddard, Xerxes T.; and Terry, Ruel C. Heating Frasch sulphur mine water using waste heat. 4,051,889, Cl. 165-1.000.

Stolka, Milan; and Yanus, John F., to Xerox Corporation. Photoconductive imaging member with substituted anthracene plasticizer. 4,052,205, Cl. 96-1.0PC.

Stoltzfus, Henry: *See*—
Weaver, Richard L.; Stoltzfus, John; and Stoltzfus, Henry, 4,052,108, Cl. 302-60.000.

Stoltzfus, John: *See*—
Weaver, Richard L.; Stoltzfus, John; and Stoltzfus, Henry, 4,052,108, Cl. 302-60.000.

Stone, Cecil M.: *See*—
Fernley, George W.; and Stone, Cecil M., 4,052,342, Cl. 252-541.000.

Stouffer, Ronald D.; and Bray, Harry C., Jr., to Bowles Fluidics Corporation. Controlled fluid dispersal techniques. 4,052,002, Cl. 239-4.000.

Stradmann, Adolf: *See*—
Groth, Volker; Stradmann, Adolf; and Pelzel, Erich, 4,051,887, Cl. 164-76.000.

Stratton, Boyd Lehman, to Arvin Industries, Inc. Transducer carriage transport having cylindrical bearings and a grooved guide member. 4,052,743, Cl. 360-99.000.

Strauff, Gunter, to Langen Company. Arrangement for steering-power limitation in hydraulic servo-steering systems. 4,051,766, Cl. 91-417.00R.

Strauff, Gunther, to Langen & Co. Method for gas-and fluid-tight sealing of boreholes which are threadless and under pressure, and are mounted in a hardenable raw material. 4,052,233, Cl. 148-12.100.

Streifer, William, to Xerox Corporation. Digital half-tone grey scale expansion system. 4,052,715, Cl. 346-160.000.

Strohschein, Robert J.: *See*—
Simpson, William R.; and Strohschein, Robert J., 4,052,510, Cl. 424-263.000.

Strok, Jack M., to General Electric Company. High pressure sodium vapor lamp stabilized for pulse operation. 4,052,636, Cl. 313-217.000.

Strolenberg, Willem Josef George. Life saving garment. 4,051,568, Cl. 9-340.000.

Strong, James P., III: *See*—
Schaefer, David H.; and Strong, James P., III, 4,052,705, Cl. 340-173.0LM.

Struthers Scientific and International Corporation: *See*—
Kern, Hobart Malcolm, Jr., 4,051,603, Cl. 34-57.00A.

Studiengesellschaft Kohle m.b.H.: *See*—
Wilke, Gunther; and Heimbach, Paul, 4,052,435, Cl. 560-128.000.

Sturtz, Georges L.; Lecolier, Serge L.; Clement, Jean-Claude; and Biehler, Jean Marie, to Societe Nationale des Poudres et Explosifs. Diol-phosphonates. 4,052,487, Cl. 260-945.000.

Stuttgen, Friedel: *See*—
Ippen, Jakob; and Stuttgen, Friedel, 4,051,883, Cl. 152-324.000.

Su, Kai: *See*—
Musher, Jeremy; and Su, Kai, 4,052,369, Cl. 260-77.5CH.

Sugai, Shinji: *See*—
Fukuda, Yoji; Fukushima, Fumio; Tsujimoto, Yoshinobu; Fukai, Masakazu; and Sugai, Shinji, 4,052,329, Cl. 252-301.40F.

Sugiura, Katsuhiko, to Fuji Jukogyo Kabushiki Kaisha. Internal combustion engine for motor vehicles. 4,051,824, Cl. 123-119.00A.

Sukekawa, Ikuo: *See*—
Nishitani, Kiyoshi; Ebina, Ryuzo; Sukekawa, Ikuo; and Shintani, Shuji, 4,051,787, Cl. 108-55.300.

Sukle, Vincent F. Lubricating system for bearings. 4,051,922, Cl. 184-7.00R.

Sukornick, Bernard: *See*—
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,052,468, Cl. 260-648.00F.

Sullivan, Roger J. Celestial display device. 4,051,607, Cl. 35-43.000.

Sulzer Brothers Limited: *See*—
Brunner, Alfred, 4,052,586, Cl. 219-284.000.

Sumitomo Chemical Company, Limited: *See*—
Kanagawa, Shuichi; Tanimura, Shozo; and Sagawa, Seiji, 4,052,363, Cl. 260-45.9KA.
Yagi, Yoshiharu; Yasui, Seimei; Sato, Hiroshi; Noguchi, Takanobu; and Yamamoto, Michio, 4,052,473, Cl. 260-669.00P.

Sun Chemical Corporation: *See*—
Angus, James W., 4,052,597, Cl. 235-92.00C.
Whelan, Edward J.; and Douma, William L., 4,052,152, Cl. 432-122.000.

Sun, Kwok K., to Upjohn Company, The. Process for the preparation of bisphenol-A. 4,052,466, Cl. 260-619.00A.

Sunder, Shyam: *See*—
Peet, Norton P.; and Sunder, Shyam, 4,052,385, Cl. 260-239.0BF.

Sundstrand Corporation: *See*—
Hucker, David J., 4,052,658, Cl. 363-43.000.

Suprunov, Vladimir; Kryczun, Alfred; and Manshausen, Theodor, to Klockner-Humboldt-Deutz Aktiengesellschaft. Kiln for the thermal treatment of slurry type materials such as magnesite. 4,051,602, Cl. 34-10.000.

Suresh, Dev D.; Bremer, Noel J.; and Grasselli, Robert K., to Standard Oil Company, The. Preparation of maleic anhydride from four-carbon hydrocarbons. 4,052,418, Cl. 260-346.740.

Susi, Peter Vincent; and Oppelt, John Christian, to American Cyanamid Company. N-(2,2-dimethyl-6,6-di(lower alkyl)-4-piperidinyl)-amides of hindered 3,5-dialkyl-4-hydroxybenzoic acids and use as light stabilizers in polyolefins. 4,052,361, Cl. 260-45.80N.

Sutton, Paul J. Telephone system. 4,052,570, Cl. 179-90.00B.

Suzuki, Motoo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Multicylinder internal combustion engine. 4,051,674, Cl. 60-282.000.

Suzuki, Takeo; Inoue, Ikutaro; Tamai, Hideo; and Aoki, Masatsugu, to Alps Electric Co., Ltd. Printing apparatus. 4,051,942, Cl. 197-49.000.

Svensson, Arne B.: *See*—
Johansson, Reinhold A.; and Svensson, Arne B., 4,051,772, Cl. 99-427.000.

Svensson, Christer: *See*—
Staff, Finn; and Svensson, Christer, 4,051,959, Cl. 214-38.0BA.

Swanson, Kenneth P., to Progressive Equipment, Inc. Fiber condenser. 4,051,577, Cl. 19-291.000.

Sweeney, Richard Francis: *See*—
Peterson, James Oliver; Sukornick, Bernard; Sweeney, Richard Francis; Nychka, Henry R.; Eibeck, Richard E.; and Berenbaum, Morris B., 4,052,468, Cl. 260-648.00F.

Swift & Company: *See*—
Everman, Wayne F.; and Bernard, Vincent E., 4,051,753, Cl. 83-29.000.

Swiss Aluminium Limited: *See*—
Yarwood, John C.; Dore, James E.; and Preuss, Robert K., 4,052,198, Cl. 75-68.00R.

Symborski, Alex P.: *See*—
Cunningham, Cecil R.; and Symborski, Alex P., 4,052,016, Cl. 242-18.00G.

Syracuse Tank & Manufacturing Co., Inc.: *See*—
Lombardi, Jack P.; Lombardi, Francis T.; and Lombardi, Tarky J., Jr., 4,051,639, Cl. 52-64.000.

Szabo, Lajos: *See*—
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,052,404, Cl. 260-293.530.

Szantay, Csaba; Vedres, Andras; Thuranszky, Karoly; Balogh, Gyula; and Vedres nee Kozma, Maria, to EGYT Gyogyszervegyeszeti Gyar. 2-Hydroxyimino-1,2,3,4,6,7-hexahydro-11bH-benzo [a] quinolisine derivatives. 4,052,403, Cl. 260-288.0CF.

Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, to Richter Gedeon Vegyeszeti Gyar Rt. Indolo (2,3-α)quinolizines. 4,052,404, Cl. 260-293.530.

Szporny, Laszlo: *See*—
Szantay, Csaba; Szabo, Lajos; Kalaus, Gyorgy; Karpati, Egon; and Szporny, Laszlo, 4,052,404, Cl. 260-293.530.

T K Valve & Manufacturing, Inc.: *See*—
Bowden, Billy W., 4,052,091, Cl. 285-305.000.

Takada, Yoshikazu: *See*—
Nakaoka, Kazuhide; Araki, Kenji; Takada, Yoshikazu; Osaka, Shinobu; and Hirogami, Katsuhiko, 4,052,235, Cl. 148-156.000.

Takagi, Izumi; and Yanagiuchi, Noboru, to Kawasaki Heavy Industries, Ltd. Drive clutch for the V-belt type automatic transmission. 4,051,739, Cl. 74-230.17E.

Takahi, Yukiyoshi: *See*—
Jojima, Teruomi; and Takahi, Yukiyoshi, 4,052,395, Cl. 424-250.000.

Takakubo, Michihiko: *See*—
Nagase, Kazuhiko; and Takakubo, Michihiko, 4,052,109, Cl. 303-25.000.

Takara Co., Ltd.: *See*—
Ogawa, Iwakichi, 4,051,623, Cl. 46-103.000.
Ogawa, Iwakichi, 4,051,624, Cl. 46-202.000.

Takasago Perfumery Co., Ltd.: *See*—
Nagakura, Akira; Moroe, Michio; Koyama, Yasuto; and Kurihara, Haruki, 4,052,457, Cl. 260-586.00G.

Takeda Chemical Industries, Ltd.: *See*—
Furukawa, Yoshiyasu; and Miyashita, Osamu, 4,052,391, Cl. 544-117.000.

Takeda, Fumio: *See*—
Takeichi, Yoshihiro; Hashimoto, Tsutomu; Takeda, Fumio; and Katagi, Takashi, 4,052,724, Cl. 343-786.000.

Takeichi, Yoshihiro; Hashimoto, Tsutomu; Takeda, Fumio; and Katagi, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Branching filter. 4,052,724, Cl. 343-786.000.

Takeishi, Norikazu. Cylinder internal grinder. 4,051,637, Cl. 51-364.000.

Takeuchi, Tomio: *See*—
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,052,449, Cl. 260-519.000.

Tally Corporation: *See*—
Starr, David G., 4,051,944, Cl. 197-168.000.

Tamai, Hideo: *See*—
Suzuki, Takeo; Inoue, Ikutaro; Tamai, Hideo; and Aoki, Masatsugu, 4,051,942, Cl. 197-49.000.

Tamura, Masuhiko; and Yasui, Teruo, to Kuraray Co., Ltd. Process for preparing glycol esters. 4,052,442, Cl. 560-243.000.

Tanaka, Mizuo: *See*—
Yamagishi, Hidehisa; Tanaka, Mizuo; and Shiono, Riichi, 4,052,234, Cl. 148-156.000.

Tandeske, Duane R.: *See*—
Zias, Arthur R.; and Tandeske, Duane R., 4,051,712, Cl. 73-4.00R.

Tani, Haruhisa: *See*—
Yazawa, Masahide; Tani, Haruhisa; Matsumoto, Masaki; and Sasaki, Yasuo, 4,052,242, Cl. 156-265.000.

Yazawa, Masahide; Tani, Haruhisa; Matsumoto, Masaki; and Sasaki, Yasuo, 4,052,243, Cl. 156-265.000.
Tani, Kenroku: *See—*
Hayakawa, Daishiro; and Tani, Kenroku, 4,052,627, Cl. 310-322.000.
Tanimura, Shozo: *See—*
Kanagawa, Shuichi; Tanimura, Shozo; and Sagawa, Seiji, 4,052,363, Cl. 260-45.9KA.
Tannenberger, Helmut; and van den Berghe, Paul, to Compagnie Francaise de Raffinage. Electrolyte-electrode assembly for a combustible battery. 4,052,532, Cl. 429-33.000.
Taoda, Kiyomichi: *See—*
Shirakawa, Seiichi; Iwahashi, Koji; Nishi, Akio; Honda, Keisuke; and Taoda, Kiyomichi, 4,052,172, Cl. 48-197.00R.
Tausanovitch, Dusan: *See—*
Lovisa, Peter R.; Tausanovitch, Dusan; and Lovisa, Tullio E., 4,052,032, Cl. 249-40.000.
Taylor, Bill P., Jr.: *See—*
Felter, John V.; Taylor, Bill P., Jr.; and Rudine, Kenneth M., 4,051,770, Cl. 98-43.00B.
Taylor, Edward R. Method and means for securing railroad cars to a barge deck. 4,052,027, Cl. 248-119.00R.
Taylor, Glenn R.: *See—*
Mullen, John H.; and Taylor, Glenn R., 4,052,582, Cl. 200-330.000.
Taylor, William L., to Pixley Richards West, Inc. Ejector pin retracting means for plastic molding dies. 4,052,033, Cl. 249-67.000.
Teague, J. T. Horizontal pipe handling apparatus. 4,051,956, Cl. 214-1.00P.
Tengler, John N.; Mesaros, Stephen A.; and Venaleck, John T., to A P Products Incorporated. Integrated circuit socket. 4,052,117, Cl. 339-17.0CF.
Tenneco Chemicals, Inc.: *See—*
Rudner, Bernard; and Pauly, Peter Daniel, 4,052,346, Cl. 260-2.5AM.
Stanaback, Robert J., 4,052,546, Cl. 526-206.000.
Stanaback, Robert J., 4,052,548, Cl. 526-214.000.
Terminal Data Corporation: *See—*
Burton, John S.; and Whitney, Ronald L., 4,052,128, Cl. 355-77.000.
Terp, Leslie S.: *See—*
United States of America, National Aeronautics and Space Administration; and Terp, Leslie S., 4,051,877, Cl. 141-4.000.
Terry, John H. Module building foundation and floor system. 4,051,642, Cl. 52-293.000.
Terry, Ruel C.: *See—*
Stoddard, Xerxes T.; and Terry, Ruel C., 4,051,889, Cl. 165-1.000.
Terwee, Thomas Henricus Marie; and Nijhuis, Jan, to Hollandse Signaalapparaten B.V. Method of manufacturing twistless yarn and yarn made by this method. 4,051,658, Cl. 57-140.0BY.
Texaco Development Corporation: *See—*
Marquis, Edward T.; and Watts, Lewis W., Jr., 4,052,456, Cl. 260-570.00D.
Texaco Inc.: *See—*
Child, Edward T.; Schlinger, Warren G.; and Richter, George N., 4,052,176, Cl. 55-32.000.
Cole, Edward L.; Hess, Howard V.; and Franz, William F., 4,052,169, Cl. 44-1.00R.
Crookshank, Fred T., 4,052,322, Cl. 252-18.000.
Texas Instruments Incorporated: *See—*
Leuschner, Horst, 4,052,701, Cl. 340-171.00R.
Soobik, Lembit; and Leuschner, Horst, 4,052,700, Cl. 340-171.0PF.
Thayer, Billy E.: *See—*
Maitland, David Steven; and Thayer, Billy E., 4,052,604, Cl. 364-786.000.
Thiessen, Fritz: *See—*
Krabetz, Richard; Engelbach, Heinz; Lebert, Ulrich; Frey, Walter; Duembgen, Gerd; Thiessen, Fritz; and Willersinn, Carl-Heinz, 4,052,450, Cl. 260-533.00N.
Thoma, Herwig. Method of and apparatus for automatically controlling heart-synchronized circulating pumps. 4,051,841, Cl. 128-2.05R.
Thoma, Jozef A.: *See—*
Klein, Joseph F. M.; Stijfs, Petrus A. M. J.; and Thoma, Jozef A., 4,052,458, Cl. 260-586.00C.
Thomanek, Franz Rudolf, to Messerschmitt-Bolkow-Blohm Gesellschaft mit Beschrankter Haftung. Armament system and explosive charge construction therefor. 4,051,763, Cl. 89-36.00R.
Thomas, Brian Martin: *See—*
Cook, Barry; Dingwall, John Grey; and Thomas, Brian Martin, 4,052,160, Cl. 21-2.70A.
Thomas, Rainer: *See—*
Dockner, Toni; Wallis, Albrecht; Fikentscher, Rolf; Thomas, Rainer; and Herzog, Reinhard, 4,052,384, Cl. 260-239.00E.
Thompson, Francis T., to Westinghouse Electric Corporation. Optimum battery reconnect for a field controlled electric vehicle. 4,052,647, Cl. 318-139.000.
Thompson, Thomas L. Method of assembling flotation units. 4,051,591, Cl. 29-433.000.
Thomson-CSF: *See—*
Spitz, Erich; d'Auria, Luigi; and Huignard, Jean-Pierre, 4,052,706, Cl. 340-173.0LM.
Thordarson, Inc.: *See—*
Thordarsson, Petur, 4,051,729, Cl. 73-407.00R.
Thordarsson, Petur, to Thordarson, Inc. Amplifier beam type transducer. 4,051,729, Cl. 73-407.00R.
Thuranszky, Karoly: *See—*
Szantay, Csaba; Vedres, Andras; Thuranszky, Karoly; Balogh, Gyula; and Vedres nee Kozma, Maria, 4,052,403, Cl. 260-288.0CF.
Tidril Corporation: *See—*
Cherrington, Martin D., 4,051,911, Cl. 175-107.000.
Tienor, Lawrence J.: *See—*
Anderl, Richard F.; and Tienor, Lawrence J., 4,052,590, Cl. 219-438.000.
Tierney, Paul A.: *See—*
Harakas, Nicholas K.; Fulton, Kent H.; Tierney, Paul A.; and Bender, Malcolm F., 4,052,524, Cl. 428-383.000.
Tieszen, Dale O.: *See—*
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Tiggelers, Hubertus H.; and Chlod, Martinus P., to Pitney-Bowes, Inc. Photoconductor storing apparatus. 4,051,986, Cl. 226-114.000.
Time Computer, Inc.: *See—*
O'Connor, Arthur H.; and McCullough, Robert E., 4,051,662, Cl. 58-4.00A.
Tinholt, Thomas H.: *See—*
Crisenbery, Richard T.; and Tinholt, Thomas H., 4,051,936, Cl. 192-58.00B.
Tinker, Harold Burnham; and Morris, Donald E., to Monsanto Company. Hydroformylation process. 4,052,461, Cl. 260-599.000.
Tinnes, Bernhard, to Metacon AG. Process and apparatus for the assembly of sliding gate valve units for casting ladles. 4,051,589, Cl. 29-405.000.
Tioxide Group Limited: *See—*
Howard, Peter Barry, 4,052,222, Cl. 106-300.000.
Howard, Peter Barry, 4,052,223, Cl. 106-300.000.
Howard, Peter Barry, 4,052,224, Cl. 106-300.000.
Tischlinger, Edward A. Disposable medicament injector. 4,051,850, Cl. 128-218.0NV.
Tischlinger, Edward A. Diaphragm assembly for a medicament dispensing unit. 4,051,851, Cl. 128-218.0NV.
Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Nishikawa, Eiichiroh; Itoh, Takuji; Maeshima, Tsugio; and Kamiyama, Setsuo, 4,052,337, Cl. 252-455.00Z.
Toal, Ted William; and Haines, Ralph Warren, to National Semiconductor Corporation. Competitive educational calculator. 4,051,605, Cl. 35-30.000.
Tobisu, Torao. Apparatus for electrostatically purifying non-conductive liquid. 4,052,289, Cl. 204-302.000.
Togashi, Hachiro J.: *See—*
Mercer, James L.; and Togashi, Hachiro J., 4,052,293, Cl. 208-11.00R.
Tokheim Corporation: *See—*
Zabel, William P., 4,051,998, Cl. 364-465.000.
Tokico Ltd.: *See—*
Hayashida, Yoshihiro, 4,051,928, Cl. 188-79.50P.
Karasudani, Yasuo, 4,051,926, Cl. 188-73.300.
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Kotsuka, Tadashi; and Ohchi, Torao, 4,051,795, Cl. 112-153.000.
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Topic, Eugene Frank. Ignition system for use with internal combustion engines. 4,051,828, Cl. 123-148.00E.
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Lerner, Robert Wendell; Towers, Russell S.; and Flasch, John Robert, 4,052,428, Cl. 260-448.0AD.
Townsend, Rodney C., to Mine Support Systems (Proprietary) Limited. Compressible mine support. 4,052,029, Cl. 248-356.000.
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Kato, Shiro; and Hattori, Yasuhiro, 4,051,583, Cl. 29-40.000.
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Arai, Hajime; and Ohnuma, Kiyoshi, 4,051,932, Cl. 192-3.300.
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Tozo, Nakamura. Self-learning apparatus for reading and writing of the Japanese language. 4,051,606, Cl. 35-35.00C.
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Segal, Jack S.; and Trapp, Harold D., 4,051,724, Cl. 73-198.000.
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Namy, Gerald; Becker, August; and Trappe, Klaus, 4,052,196, Cl. 75-25.000.
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Triner Scale and Manufacturing Company: *See—*
Gudea, Dumitru, 4,051,913, Cl. 177-25.000.
Trumley, Richard L.; and Linn, Randy W., to General Aluminum Products, Incorporated. Portable greenhouse. 4,051,626, Cl. 47-17.000.
Trupp, William. Paint and stain shield. 4,051,808, Cl. 118-504.000.
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TRW Canada Limited: *See—*
Donegan, Edward Alfred, 4,051,906, Cl. 173-131.000.
TRW Inc.: *See—*
Schrader, Gustav E., 4,052,284, Cl. 204-224.00M.
Zehren, James N., 4,051,989, Cl. 226-190.000.
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Nakamura, Tatsuji; Fukuda, Kenji; Tsuji, Toshihiko; Maruyama, Takeo; Sakai, Ryouji; Sawada, Shohei; and Miyoshi, Haruki, 4,052,588, Cl. 219-345.000.
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Tucci, Domenick; and Cantalupi, Lewis. Enclosure alarm system. 4,052,718, Cl. 340-274.00R.
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Pflaum, William D.; and Tullis, Mark E., 4,051,778, Cl. 101-133.000.
Tuma, Alois Vaclav; and Schiess, Jorg, to RCA Corporation. Frequency doubler. 4,052,626, Cl. 307-271.000.
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Turner, Raymond J.; Kameya, Andrew M.; and Salman, Naif D., to Hycom Incorporated. Control system with fast response. 4,052,598, Cl. 364-113.000.
Turpin, Raymond C., Jr., to Partners Limited, The, a part interest. Method of making an improved concrete. 4,052,220, Cl. 106-90.000.
Tutko, Albert John: *See—*
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Ube Industries, Ltd.: *See—*
Yoshikawa, Toshio; Sakamoto, Nagayoshi; Kurita, Masayuki; Oh-e, Shunji; and Nagamori, Tomitada, 4,052,362, Cl. 260-45.9NC.
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Yamazaki, Eiichi; Ogura, Iwao; Ueda, Toshio; Maruyama, Koichi; and Shimizu, Kenji, 4,052,122, Cl. 350-189.000.
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Ulricksen, Ralph L. Marine stove safety controls. 4,052,136, Cl. 431-77.000.
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Sherman, Charles F., 4,051,748, Cl. 76-110.000.
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Herzer, William P.; and Cullen, Robert E., 4,051,794, Cl. 112-121.120.
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Hayward, Alan Thomas Joseph, 4,051,711, Cl. 73-3.000.
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Hay, Andrew George, 4,052,107, Cl. 299-62.000.
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Eide, Richard H.; and Golembeck, Gerald A., 4,051,644, Cl. 53-125.000.
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Smith, James M., 4,051,979, Cl. 222-3.000.
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Auer, Siegfried O.; and Schutt, John B. Remote sensing of vegetation and soil using microwave ellipsometry. 4,052,666, Cl. 324-58.50B.
Grunthaner, Frank J.; and Lewis, Blair F. Photoelectron spectrometer with means for stabilizing sample surface potential. 4,052,614, Cl. 250-310.000.
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Terp, Leslie S. Gas compression apparatus. 4,051,877, Cl. 141-4.000.
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Marek, Cecil J., 4,052,144, Cl. 431-352.000.
Nola, Frank J., 4,052,648, Cl. 318-200.000.
Rhodes, Marvin D.; and Mikulas, Martin M., Jr., 4,052,523, Cl. 428-116.000.
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Vallotton, Wilbur C., 4,051,558, Cl. 3-1.200.
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Wallen, Albert E.; and Whitehead, Paul L., 4,051,799, Cl. 114-244.000.
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Bulthuis, Kornelis; Derksema, Bram Johan; Dijkstra, Hendrik Tjalling; and van de Wal, Johannes, 4,052,681, Cl. 331-94.50D.
De Kok, Johannis, 4,052,634, Cl. 313-184.000.
Druyvesteyn, Willem Frederik; and Booij, Harm Marinus Wilhelm, 4,052,707, Cl. 340-174.0TF.
Eggermont, Ludwig Desire Johan, 4,052,605, Cl. 364-724.000.
Eijnthoven, Ronald Karel; and van Kemenade, Johannes Trudo Cornelis, 4,052,340, Cl. 252-518.000.
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Jacobs, Cornelis Adrianus Joannes, 4,052,635, Cl. 313-217.000.
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Reijnhard, Johannes Martinus, 4,052,022, Cl. 242-147.00A.
Roos, Jan, 4,052,747, Cl. 360-110.000.
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Beane, David J.; and Kaplan, Ronald M., 4,051,708, Cl. 72-354.000.
Pierce, Robert M., 4,051,670, Cl. 60-39.72R.
Walker, Bryant H.; Carruthers, William D.; and MacNitt, Donald G., Jr., 4,051,585, Cl. 29-156.80R.
Willard, Charles M., 4,052,007, Cl. 239-265.290.
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Asahara, Nakaba; Asai, Yasuhiko; and Yasue, Kenji, 4,052,481, Cl. 260-857.0PE.
University of California, The Regents of the: *See—*
Evans, David A., 4,052,434, Cl. 560-121.000.
Garrett, Roger E.; and Christensen, Paul, 4,052,617, Cl. 250-360.000.
Upjohn Company, The: *See—*
Schneider, William P., 4,052,552, Cl. 542-413.000.
Sun, Kwok K., 4,052,466, Cl. 260-619.00A.
Ursic, Mario. Machine for sealing packages. 4,051,646, Cl. 53-366.000.
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Baum, Walter; and Brendel, Hans Helmut, 4,051,701, Cl. 69-33.000.
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Valdettaro, Alarico A., to Sarkes Tarzian, Inc. UHF tuner arrangement. 4,052,675, Cl. 325-465.000.
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Van Huisen, Allen T. Multiple-completion geothermal energy production systems. 4,051,677, Cl. 60-641.000.
van Kemenade, Johannes Trudo Cornelis: *See—*
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van Montfoort, Abraham; and Scholten, Joseph J. F., to Stamicarbon B.V. Process for preparing noble metal catalysts. 4,052,336, Cl. 252-447.000.
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Krenzer, John, 4,052,191, Cl. 71-90.000.
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Tengler, John N.; Mesaros, Stephen A.; and Venaleck, John T., 4,052,117, Cl. 339-17.0CF.
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Beneke, Jene A.; Otsuka, Tsuruo; Otsuka, Steven R.; and Sarkisian, Samuel G., 4,051,933, Cl. 192-18.00A.
Vertenstein, Mathieu J., to CF&I Engineers, Inc. Preheating device for centrifugal. 4,052,304, Cl. 210-78.000.
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Holzer, Franz; and Schmolzer, Gerhard, 4,052,309, Cl. 204-181.000.
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Vincens, Rene F. Composite structures. 4,051,640, Cl. 52-220.000.
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Voegele, William P., Jr. Top hung sliding window assembly. 4,051,633, Cl. 49-411.000.
Voegeli, Otto: *See—*
Calhoun, Bertram A.; Slonczewski, John C.; and Voegeli, Otto, 4,052,710, Cl. 340-174.0TF.
Vogt, Alfred, to Interliz Anstalt. Heating system. 4,052,001, Cl. 237-1.00A.
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Volk, Anthony J. Poultry leg retainer. 4,051,573, Cl. 17-11.000.
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Grundmann, Edgard, 4,051,917, Cl. 181-200.000.
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Hutt, Peter Richard; Blake, Alan Ronald; von Cavallar, Gunter; Douglas, Brian Neil; and Dodds, Philip John, 4,052,719, Cl. 340-324.0AD.
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von Krusenstierna, Otto, to Aktiebolaget Tudor. Electric accumulator cell with at least one dissoluble electrode. 4,052,541, Cl. 429-233.000.
vonStroh, Gerald F. H. H., III. Apparatus for injecting granular material into a molten metal. 4,052,041, Cl. 266-81.000.
Voth, Harold William: *See—*
Burkhart, Merle Keith; White, Bruce Lynn; Goossen, La Vern Roy; White, Allen Andrew; and Voth, Harold William, 4,052,011, Cl. 241-30.000.
Votta, Gerald A., to I-T-E Imperial Corporation. Magnetically driven ring arc runner for circuit interrupter. 4,052,577, Cl. 200-147.00R.
Voytik, Paul: *See—*
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Wade, Mark W.; and Goodrum, Donald A., to Nemec, James, by said Donald A. Goodrum. Self-locking cable trolley. 4,051,798, Cl. 114-199.000.
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Lange, Gerhard, 4,051,667, Cl. 59-31.000.
Wahlen, Antonius; and Otten, Klaus-Detlef, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Method and apparatus for wetting thread in a double twist twisting spindle. 4,051,651, Cl. 57-35.000.
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Waldrum, John E., to Amchem Products, Inc. Can washing and coating system. 4,051,805, Cl. 118-58.000.
Walker, Bryant H.; Carruthers, William D.; and MacNitt, Donald G., Jr., to United Technologies Corporation. Method of forming a turbine rotor. 4,051,585, Cl. 29-156.80R.
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Warkentin, Aaron James. Comestible packaging apparatus. 4,051,645, Cl. 53-248.000.
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Wasa, Kiyotaka: *See*—
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B 112,422	3,913,484	Oct. 21, 1975	B 288,638	3,925,132	Dec. 9, 1975
B 150,560	3,913,654	Oct. 21, 1975	B 289,175	3,924,309	Dec. 9, 1975
B 176,995	3,915,773	Oct. 28, 1975	B 289,471	3,917,184	Nov. 4, 1975
B 178,475	3,944,602	Mar. 16, 1976	B 289,523	3,921,166	Nov. 18, 1975
B 189,772	3,925,367	Dec. 9, 1975	B 289,883	3,925,063	Dec. 9, 1975
B 189,773	3,925,405	Dec. 9, 1975	B 290,328	3,924,838	Dec. 9, 1975
B 190,679	3,925,346	Dec. 9, 1975	B 291,104	3,925,007	Dec. 9, 1975
B 198,810	3,916,043	Oct. 28, 1975	B 291,694	3,925,339	Dec. 9, 1975
B 204,161	3,924,605	Dec. 9, 1975	B 292,054	3,915,877	Oct. 28, 1975
B 207,272	3,914,123	Oct. 21, 1975	B 292,126	3,914,465	Oct. 21, 1975
B 211,786	3,914,300	Oct. 21, 1975	B 292,140	3,914,340	Oct. 21, 1975
B 213,211	3,925,269	Dec. 9, 1975	B 292,300	3,927,167	Dec. 16, 1975
B 220,683	3,914,471	Oct. 21, 1975	B 292,563	3,923,653	Dec. 2, 1975
B 222,188	3,914,739	Oct. 21, 1975	B 293,378	3,923,725	Dec. 2, 1975
B 223,621	3,925,526	Dec. 9, 1975	B 293,437	3,913,414	Oct. 21, 1975
B 224,323	3,925,476	Dec. 9, 1975	B 294,103	3,924,396	Dec. 9, 1975
B 233,383	3,925,424	Dec. 9, 1975	B 294,579	3,916,737	Nov. 4, 1975
B 233,741	3,925,326	Dec. 9, 1975	B 294,673	3,916,023	Oct. 28, 1975
B 235,011	3,925,086	Dec. 9, 1975	B 295,481	3,921,593	Nov. 25, 1975
B 235,925	3,924,949	Dec. 9, 1975	B 295,674	3,916,107	Oct. 28, 1975
B 236,609	3,925,187	Dec. 9, 1975	B 295,860	3,923,880	Dec. 2, 1975
B 237,953	3,924,051	Dec. 2, 1975	B 299,267	3,917,106	Nov. 4, 1975
B 239,289	3,922,711	Nov. 25, 1975	B 300,353	3,921,734	Nov. 25, 1975
B 241,433	3,923,711	Dec. 2, 1975	B 302,271	3,929,130	Dec. 30, 1975
B 245,194	3,919,179	Nov. 11, 1975	B 302,692	3,924,598	Dec. 9, 1975
B 248,916	3,920,862	Nov. 18, 1975	B 302,836	3,923,573	Dec. 2, 1975
B 251,109	3,914,148	Oct. 21, 1975	B 302,998	3,928,233	Dec. 23, 1975
B 251,635	3,914,149	Oct. 21, 1975	B 303,011	3,930,188	Dec. 30, 1975
B 252,947	3,923,803	Dec. 2, 1975	B 303,702	3,914,131	Oct. 21, 1975
B 254,211	3,917,677	Nov. 4, 1975	B 304,687	3,924,783	Dec. 9, 1975
B 254,708	3,923,878	Dec. 2, 1975	B 305,417	3,915,882	Oct. 28, 1975
B 255,756	3,923,781	Dec. 2, 1975	B 305,868	3,921,463	Nov. 25, 1975
B 256,334	3,924,988	Dec. 9, 1975	B 305,881	3,923,478	Dec. 2, 1975
B 256,936	3,925,513	Dec. 9, 1975	B 306,655	3,924,642	Dec. 9,1975
B 258,687	3,914,221	Oct. 21, 1975	B 306,829	3,925,411	Dec. 9, 1975
B 259,236	3,924,874	Dec. 9, 1975	B 306,938	3,916,050	Oct. 28, 1975
B 259,274	3,928,688	Dec. 23, 1975	B 307,677	3,915,276	Oct. 28, 1975
B 260,455	3,925,634	Dec. 9, 1975	B 308,661	3,924,349	Dec. 9, 1975
B 260,945	3,925,250	Dec. 9, 1975	B 308,892	3,919,624	Nov. 11, 1975
B 261,378	3,913,468	Oct. 21, 1975	B 309,207	3,914,743	Oct. 21, 1975
B 261,828	3,925,551	Dec. 9, 1975	B 309,499	3,922,002	Nov. 25, 1975
B 262,241	3,925,528	Dec. 9, 1975	B 309,681	3,927,374	Dec. 16, 1975
B 262,287	3,921,209	Nov. 18, 1975	B 309,755	3,919,468	Nov. 11, 1975
B 262,378	3,914,410	Oct. 21, 1975	B 309,756	3,914,136	Oct. 21, 1975
B 262,599	3,925,323	Dec. 9, 1975	B 309,860	3,922,485	Nov. 25, 1975
B 264,257	3,928,665	Dec. 23, 1975	B 310,149	3,924,705	Dec. 9, 1975
B 264,833	3,923,566	Dec. 2, 1975	B 310,271	3,923,689	Dec. 2, 1975
B 265,369	3,925,245	Dec. 9, 1975	B 310,740	3,985,686	Oct. 12, 1976
B 265,727	3,914,479	Oct. 21, 1975	B 311,313	3,925,142	Dec. 9, 1975
B 265,862	3,915,915	Oct. 28, 1975	B 311,317	3,918,975	Nov. 11, 1975
B 266,195	3,923,599	Dec. 2, 1975	B 311,413	3,925,515	Dec. 9, 1975
B 269,673	3,914,377	Oct. 21, 1975	B 311,910	3,924,357	Dec. 9, 1975
B 270,089	3,923,875	Dec. 2, 1975	B 311,977	3,925,233	Dec. 9,1975
B 271,104	3,925,400	Dec. 9, 1975	B 312,139	3,925,530	Dec. 9, 1975
B 274,945	3,924,992	Dec. 9, 1975	B 312,477	3,923,714	Dec. 2, 1975
B 275,426	3,925,168	Dec. 9, 1975	B 313,098	3,925,045	Dec. 9, 1975
B 276,271	3,916,028	Oct. 28, 1975	B 313,531	3,925,548	Dec. 9, 1975
B 276,560	3,916,030	Oct. 28, 1975	B 313,594	3,924,626	Dec. 9, 1975
B 276,993	3,948,823	Apr. 6, 1976	B 313,900	3,915,932	Oct. 28, 1975
B 277,449	3,924,048	Dec. 2, 1975	B 314,049	3,920,588	Nov. 18, 1975
B 278,491	3,921,170	Nov. 18, 1975	B 314,255	3,923,764	Dec. 2, 1975
B 278,991	3,914,469	Oct. 21, 1975	B 314,271	3,921,845	Nov. 25, 1975
B 279,583	3,923,749	Dec. 2, 1975	B 314,489	3,925,016	Dec. 9, 1975
B 280,015	3,925,378	Dec. 9, 1975	B 314,800	3,930,087	Dec. 30, 1975
B 280,395	3,919,604	Nov. 11, 1975	B 314,977	3,923,459	Dec. 2, 1975
B 281,341	3,920,643	Nov. 18, 1975	B 315,363	3,920,673	Nov. 18, 1975
B 281,943	3,924,013	Dec. 2, 1975	B 315,397	3,923,963	Dec. 2, 1975
B 282,081	3,913,483	Oct. 21, 1975	B 315,731	3,914,108	Oct. 21, 1975
B 282,252	3,924,997	Dec. 9, 1975	B 316,014	3,920,861	Nov. 18, 1975
B 282,390	3,924,576	Dec. 9,1975	B 316,239	3,913,546	Oct. 21, 1975
B 282,819	3,982,932	Sep. 28, 1976	B 316,422	4,016,206	Apr. 19, 1977
B 283,124	3,923,512	Dec. 2, 1975	B 316,917	3,925,494	Dec. 9, 1975
B 283,300	3,925,011	Dec. 9, 1975	B 317,080	3,925,324	Dec. 9, 1975
B 284,297	3,913,722	Oct. 21, 1975	B 317,347	3,923,552	Dec. 2, 1975
B 284,427	3,952,812	Apr. 27, 1976	B 317,624	3,925,167	Dec. 9, 1975
B 285,200	3,923,680	Dec. 2, 1975	B 318,122	4,026,905	May 31, 1977
B 285,796	3,914,303	Oct. 21, 1975	B 318,195	3,915,699	Oct. 28, 1975
B 286,499	3,914,129	Oct. 21, 1975	B 318,618	3,915,365	Oct. 28, 1975
B 286,614	3,924,696	Dec. 9, 1975	B 318,640	3,925,186	Dec. 9, 1975
B 286,913	3,928,696	Dec. 23, 1975	B 318,745	3,916,571	Nov. 4, 1975
B 287,164	3,914,139	Oct. 21, 1975	B 319,226	3,925,082	Dec. 9, 1975
B 287,270	3,924,825	Dec. 9, 1975	B 319,339	3,916,056	Oct. 28, 1975

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DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 319,402	3,919,568	Nov. 11, 1975	B 345,060	3,916,018	Oct. 28, 1975
B 319,414	3,928,666	Dec. 23, 1975	B 345,384	3,916,146	Oct. 28, 1975
B 320,261	3,924,033	Dec. 2, 1975	B 345,390	3,940,343	Feb. 24, 1976
B 320,452	3,925,083	Dec. 9, 1975	B 345,422	3,914,392	Oct. 21, 1975
B 320,603	3,915,571	Oct. 28, 1975	B 345,527	3,927,365	Dec. 16, 1975
B 321,018	3,921,623	Nov. 25, 1975	B 345,567	3,913,985	Oct. 21, 1975
B 321,101	3,917,163	Nov. 4, 1975	B 346,044	3,988,405	Oct. 26, 1976
B 321,938	3,923,889	Dec. 2, 1975	B 346,145	3,913,293	Oct. 21, 1975
B 322,182	3,925,390	Dec. 9, 1975	B 346,210	3,916,142	Oct. 28, 1975
B 322,239	3,920,973	Nov. 18, 1975	B 346,350	3,915,824	Oct. 28, 1975
B 322,564	3,914,373	Oct. 21, 1975	B 346,487	3,927,406	Dec. 16, 1975
B 322,621	3,920,863	Nov. 18,1975	B 346,585	3,913,820	Oct. 21, 1975
B 322,777	3,924,382	Dec. 9, 1975	B 346,613	3,923,545	Dec. 2, 1975
B 323,127	3,923,967	Dec. 2, 1975	B 346,901	3,915,583	Oct. 28, 1975
B 323,191	3,914,566	Oct. 21, 1975	B 348,083	3,923,774	Dec. 2, 1975
B 323,203	3,916,165	Oct. 28, 1975	B 348,383	3,923,452	Dec. 2, 1975
B 323,568	3,920,536	Nov. 18, 1975	B 348,495	3,914,654	Oct. 21, 1975
B 323,666	3,924,568	Dec. 9, 1975	B 348,558	3,914,109	Oct. 21, 1975
B 324,493	3,928,664	Dec. 23, 1975	B 349,141	3,915,363	Oct. 28, 1975
B 324,503	3,928,524	Dec. 23, 1975	B 349,177	3,914,033	Oct. 21, 1975
B 324,505	3,925,294	Dec. 9, 1975	B 349,231	3,915,831	Oct. 28, 1975
B 324,739	3,924,990	Dec. 9, 1975	B 349,321	3,916,103	Oct. 28, 1975
B 324,879	3,923,538	Dec. 2, 1975	B 349,948	3,914,557	Oct. 21, 1975
B 325,102	3,924,355	Dec. 9, 1975	B 350,025	3,927,415	Dec. 16, 1975
B 325,261	3,921,304	Nov. 25,1975	B 350,143	3,924,419	Dec. 9, 1975
B 326,514	3,925,080	Dec. 9, 1975	B 350,219	3,917,802	Nov. 4, 1975
B 327,109	3,925,350	Dec. 9, 1975	B 350,245	3,914,331	Oct. 21, 1975
B 327,363	3,923,504	Dec. 2, 1975	B 350,523	3,924,726	Dec. 9, 1975
B 327,612	3,925,620	Dec. 9, 1975	B 350,589	3,927,419	Dec. 16, 1975
B 327,674	3,918,540	Nov. 11, 1975	B 350,708	3,923,871	Dec. 2, 1975
B 327,899	3,925,674	Dec. 9, 1975	B 350,843	3,915,461	Oct. 28, 1975
B 328,164	3,914,703	Oct. 21, 1975	B 351,055	3,914,074	Oct. 21, 1975
B 328,200	3,916,031	Oct. 28, 1975	B 351,218	3,914,186	Oct. 21, 1975
B 328,205	3,914,106	Oct. 21, 1975	B 351,222	3,921,179	Nov. 18, 1975
B 328,210	3,914,275	Oct. 21, 1975	B 351,348	3,923,563	Dec. 2, 1975
B 328,391	4,039,888	Aug. 2, 1977	B 351,421	3,914,733	Oct. 21, 1975
B 328,870	3,916,486	Nov. 4, 1975	B 351,493	3,914,758	Oct. 21, 1975
B 329,115	3,924,727	Dec. 9, 1975	B 351,535	3,915,239	Oct. 28, 1975
B 329,476	3,920,562	Nov. 18, 1975	B 351,665	3,919,701	Nov. 11, 1975
B 329,612	3,925,128	Dec. 9, 1975	B 351,672	3,914,000	Oct. 21, 1975
B 329,787	3,920,688	Nov. 18, 1975	B 351,735	3,913,385	Oct. 21, 1975
B 329,816	3,923,947	Dec. 2, 1975	B 351,863	3,914,700	Oct. 21, 1975
B 330,536	3,925,452	Dec. 9, 1975	B 351,883	3,924,657	Dec. 9, 1975
B 330,828	3,913,589	Oct. 21, 1975	B 351,926	3,914,133	Oct. 21, 1975
B 331,417	3,914,157	Oct. 21, 1975	B 351,939	3,913,480	Oct. 21. 1975
B 331,557	3,916,577	Nov. 4, 1975	B 352,445	3,928,746	Dec. 23, 1975
B 331,895	3,916,403	Oct. 28, 1975	B 352,934	3,913,692	Oct. 21, 1975
B 332,527	3,924,017	Dec. 2, 1975	B 352,950	3,922,590	Nov. 25, 1975
B 332,811	3,924,359	Dec. 9, 1975	B 352,965	3,921,926	Nov. 25, 1975
B 333,876	3,921,208	Nov. 18, 1975	B 353,317	3,916,446	Nov. 4, 1975
B 333,928	3,927,172	Dec. 16, 1975	B 353,387	3,924,404	Dec. 9, 1975
B 334,251	3,924,719	Dec. 9, 1975	B 353,546	3,913,273	Oct. 21, 1975
B 334,868	3,919,469	Nov. 11, 1975	B 354,008	3,925,081	Dec. 9, 1975
B 334,985	3,923,912	Dec. 2, 1975	B 354,098	3,925,547	Dec. 9, 1975
B 335,670	3,928,686	Dec. 23, 1975	B 354,145	3,927,279	Dec. 16, 1975
B 335,741	3,925,615	Dec. 9, 1975	B 354,296	3,914,580	Oct. 21, 1975
B 335,773	3,920,953	Nov. 18, 1975	B 354,510	3,928,658	Dec. 23, 1975
B 336,129	3,923,606	Dec. 2, 1975	B 354,889	3,913,204	Oct. 21, 1975
B 336,243	3,925,422	Dec. 9, 1975	B 354,979	3,914,251	Oct. 21, 1975
B 336,345	3,925,179	Dec. 9, 1975	B 355,095	3,925,656	Dec. 9, 1975
B 336,652	3,914,211	Oct. 21, 1975	B 355,269	3,914,561	Oct. 21, 1975
B 336,902	3,918,897	Nov. 11, 1975	B 355,510	3,913,704	Oct. 21, 1975
B 336,946	3,919,425	Nov. 11, 1975	B 355,595	3,925,649	Dec. 9, 1975
B 336,978	3,923,968	Dec. 2, 1975	B 355,876	3,925,685	Dec. 9, 1975
B 337,235	3,919,386	Nov. 11, 1975	B 356,032	3,928,636	Dec. 23, 1975
B 337,409	3,925,258	Dec. 9, 1975	B 356,253	3,925,025	Dec. 9, 1975
B 337,442	3,913,658	Oct. 21, 1975	B 356,602	3,927,393	Dec. 16, 1975
B 337,703	3,914,690	Oct. 21, 1975	B 356,724	3,924,586	Dec. 9, 1975
B 337,787	3,923,506	Dec. 2, 1975	B 357,039	3,924,406	Dec. 9, 1975
B 339,059	3,924,822	Dec. 9, 1975	B 357,057	3,913,738	Oct. 21, 1975
B 339,218	3,925,121	Dec. 9, 1975	B 357,131	3,924,453	Dec. 9, 1975
B 339,699	3,933,527	Jan. 20, 1976	B 357,402	3,914,180	Oct. 21, 1975
B 339,838	3,930,221	Dec. 30, 1975	B 357,682	3,924,973	Dec. 9, 1975
B 340,212	3,922,645	Nov. 25, 1975	B 357,803	3,919,470	Nov. 11, 1975
B 340,833	3,925,208	Dec. 9, 1975	B 358,174	3,924,958	Dec. 9, 1975
B 341,579	3,913,363	Oct. 21, 1975	B 358,244	3,913,411	Oct. 21, 1975
B 342,084	3,928,694	Dec. 23, 1975	B 358,311	3,923,561	Dec. 2, 1975
B 342,423	3,925,334	Dec. 9, 1975	B 358,939	3,924,713	Dec. 9, 1975
B 342,763	4,051,920	Oct. 4, 1977	B 359,174	3,914,117	Oct. 21, 1975
B 342,886	3,923,507	Dec. 2, 1975	B 359,187	3,924,525	Dec. 9, 1975
B 343,136	3,919,453	Nov. 11, 1975	B 359,540	3,915,235	Oct. 28, 1975
B 343,240	3,925,693	Dec. 9, 1975	B 359,740	3,936,212	Feb. 3, 1976
B 343,506	3,916,021	Oct. 28, 1975	B 359,791	3,929,430	Dec. 30, 1975
B 343,577	3,921,165	Nov. 18, 1975	B 359,825	3,921,344	Nov. 25, 1975
B 344,203	3,928,719	Dec. 23, 1975	B 359,946	3,914,132	Oct. 21, 1975
B 344,479	3,924,042	Dec. 2, 1975	B 359,947	3,914,653	Oct. 21, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 360,208	3,923,750	Dec. 2, 1975	B 382,021	3,913,212	Oct. 21, 1975
B 360,296	3,916,720	Nov. 4, 1975	B 382,261	3,914,991	Oct. 28, 1975
B 360,719	3,915,715	Oct. 28, 1975	B 382,290	3,924,717	Dec. 9, 1975
B 360,910	3,925,696	Dec. 9, 1975	B 382,783	3,919,527	Nov. 11, 1975
B 361,265	3,923,569	Dec. 2, 1975	B 382,798	3,924,435	Dec. 9, 1975
B 361,347	3,914,642	Oct. 21, 1975	B 382,840	3,922,007	Nov. 25, 1975
B 361,443	3,927,405	Dec. 16, 1975	B 383,465	3,927,412	Dec. 16, 1975
B 361,569	3,914,554	Oct. 21, 1975	B 383,581	3,925,318	Dec. 9, 1975
B 361,604	3,922,702	Nov. 25, 1975	B 383,852	3,914,246	Oct. 21, 1975
B 361,734	3,915,764	Oct. 28, 1975	B 384,499	3,925,135	Dec. 9, 1975
B 361,743	4,035,255	July 12, 1977	B 384,658	3,913,452	Oct. 21, 1975
B 361,744	4,035,254	July 12, 1977	B 384,773	3,915,416	Oct. 28, 1975
B 362,589	3,914,012	Oct. 21, 1975	B 385,210	3,913,406	Oct. 21, 1975
B 363,205	3,923,744	Dec. 2, 1975	B 386,403	3,924,895	Dec. 9, 1975
B 363,337	3,928,639	Dec. 23, 1975	B 386,592	3,925,305	Dec. 9, 1975
B 363,457	3,922,595	Nov. 25, 1975	B 387,039	3,924,510	Dec. 9, 1975
B 363,674	3,929,716	Dec. 30, 1975	B 387,331	3,913,701	Oct. 21, 1975
B 363,892	3,913,395	Oct. 21, 1975	B 387,363	3,927,378	Dec. 16, 1975
B 363,962	3,921,826	Nov. 25, 1975	B 387,687	3,918,151	Nov. 11, 1975
B 364,022	3,913,499	Oct. 21, 1975	B 387,761	3,914,245	Oct. 21, 1975
B 364,163	3,916,092	Oct. 28, 1975	B 387,790	3,925,380	Dec. 9, 1975
B 364,241	3,916,668	Nov. 4, 1975	B 387,818	3,918,935	Nov. 11, 1975
B 364,334	3,924,670	Dec. 9, 1975	B 388,580	3,923,712	Dec. 2, 1975
B 364,528	3,919,510	Nov. 11, 1975	B 389,070	3,914,171	Oct. 21, 1975
B 364,786	3,921,673	Nov. 25, 1975	B 389,295	3,914,631	Oct. 21, 1975
B 364,910	3,925,335	Dec. 9, 1975	B 389,327	3,924,504	Dec. 9, 1975
B 365,371	3,988,181	Oct. 26, 1976	B 389,639	3,914,626	Oct. 21, 1975
B 365,490	3,918,527	Nov. 11, 1975	B 389,726	3,921,010	Nov. 18, 1975
B 365,834	3,914,702	Oct. 21, 1975	B 389,807	3,922,623	Nov. 25, 1975
B 365,841	3,925,628	Dec. 9, 1975	B 389,932	3,913,268	Oct. 21, 1975
B 365,855	3,917,258	Nov. 4, 1975	B 389,933	3,913,267	Oct. 21, 1975
B 366,287	3,924,946	Dec. 9, 1975	B 390,679	3,913,668	Oct. 21, 1975
B 366,402	3,928,053	Dec. 23, 1975	B 390,732	3,913,378	Oct. 21, 1975
B 366,589	3,914,719	Oct. 21, 1975	B 390,738	4,035,343	July 12, 1977
B 367,021	3,914,752	Oct. 21, 1975	B 391,184	3,914,214	Oct. 21, 1975
B 367,040	3,924,775	Dec. 9, 1975	B 391,210	3,914,220	Oct. 21, 1975
B 367,661	3,914,158	Oct. 21, 1975	B 391,437	3,915,416	Oct. 28, 1975
B 367,739	3,923,648	Dec. 2, 1975	B 391,509	3,925,175	Dec. 9, 1975
B 367,812	3,924,789	Dec. 9, 1975	B 391,675	3,916,017	Oct. 28, 1975
B 368,081	3,924,691	Dec. 9, 1975	B 392,154	3,923,809	Dec. 2, 1975
B 368,387	3,924,923	Dec. 9, 1975	B 392,242	3,926,636	Dec. 16, 1975
B 368,392	3,913,812	Oct. 21, 1975	B 392,696	3,916,175	Oct. 28, 1975
B 368,397	3,914,677	Oct. 21, 1975	B 392,732	3,914,903	Oct. 21, 1975
B 368,862	3,925,549	Dec. 9, 1975	B 392,753	3,916,341	Oct. 28, 1975
B 369,563	3,924,449	Dec. 9, 1975	B 392,894	3,914,763	Oct. 21, 1975
B 369,607	3,923,786	Dec. 2, 1975	B 393,163	3,914,535	Oct. 21, 1975
B 369,997	3,913,533	Oct. 21, 1975	B 393,347	3,985,800	Oct. 12, 1976
B 370,453	3,964,101	Jun. 15, 1976	B 393,970	3,914,638	Oct. 21, 1975
B 370,706	3,925,242	Dec. 9, 1975	B 394,088	3,914,740	Oct. 21, 1975
B 371,073	3,930,135	Dec. 30, 1975	B 394,188	3,924,591	Dec. 9, 1975
B 371,085	3,923,783	Dec. 2, 1975	B 394,300	3,914,159	Oct. 21, 1975
B 371,787	3,921,217	Nov. 18, 1975	B 394,712	3,916,306	Oct. 28, 1975
B 371,805	3,914,433	Oct. 21, 1975	B 395,478	3,922,577	Nov. 25, 1975
B 371,836	3,923,541	Dec. 2, 1975	B 395,496	3,919,435	Nov. 11, 1975
B 372,823	3,924,660	Dec. 9, 1975	B 395,671	3,920,418	Nov. 18, 1975
B 373,051	3,914,162	Oct. 21, 1975	B 395,889	3,913,190	Oct. 21, 1975
B 373,297	3,924,436	Dec. 9, 1975	B 396,025	3,913,869	Oct. 21, 1975
B 373,326	3,920,433	Nov. 18, 1975	B 396,551	3,921,929	Nov. 25, 1975
B 373,428	3,915,511	Oct. 28, 1975	B 397,027	3,923,736	Dec. 2, 1975
B 375,220	3,920,417	Nov. 18, 1975	B 397,527	3,913,488	Oct. 21, 1975
B 375,652	3,921,303	Nov. 25, 1975	B 397,990	3,914,848	Oct. 28, 1975
B 376,504	3,914,570	Oct. 21, 1975	B 398,262	3,913,481	Oct. 21, 1975
B 376,654	3,922,513	Nov. 25, 1975	B 398,551	3,924,924	Dec. 9, 1975
B 376,742	3,924,392	Dec. 9, 1975	B 398,597	3,913,743	Oct. 21, 1975
B 376,799	3,913,955	Oct. 21, 1975	B 398,625	3,920,996	Nov. 18, 1975
B 377,172	3,918,255	Nov. 11, 1975	B 399,292	3,914,810	Oct. 28, 1975
B 377,683	3,924,433	Dec. 9, 1975	B 399,304	3,919,567	Nov. 11, 1975
B 377,833	3,913,884	Oct. 21, 1975	B 399,349	3,925,694	Dec. 9, 1975
B 377,869	3,917,002	Nov. 4, 1975	B 399,766	3,915,667	Oct. 28, 1975
B 378,621	3,923,840	Dec. 2, 1975	B 400,080	3,925,163	Dec. 9, 1975
B 379,038	3,923,994	Dec. 2, 1975	B 400,293	3,923,719	Dec. 2, 1975
B 379,172	3,914,379	Oct. 21, 1975	B 400,310	3,915,507	Oct. 28, 1975
B 379,282	3,913,462	Oct. 21, 1975	B 401,133	3,924,443	Dec. 9, 1975
B 379,955	3,913,157	Oct. 21, 1975	B 401,992	3,924,898	Dec. 9, 1975
B 380,014	3,921,915	Nov. 25, 1975	B 402,065	3,925,413	Dec. 9, 1975
B 380,141	3,925,161	Dec. 9, 1975	B 402,555	3,914,688	Oct. 21, 1975
B 380,310	3,921,048	Nov. 18, 1975	B 403,140	3,913,486	Oct. 21, 1975
B 380,312	3,913,953	Oct. 21, 1975	B 403,355	3,913,352	Oct. 21, 1975
B 380,338	3,924,873	Dec. 9, 1975	B 403,990	3,914,684	Oct. 21, 1975
B 380,446	3,923,836	Dec. 2, 1975	B 403,996	3,916,016	Oct. 28, 1975
B 380,900	3,913,307	Oct. 21, 1975	B 404,290	3,924,918	Dec. 9, 1975
B 380,926	3,925,095	Dec. 9, 1975	B 404,437	3,915,200	Oct. 28, 1975
B 381,074	3,919,583	Nov. 11, 1975	B 405,136	3,915,565	Oct. 28, 1975
B 381,632	3,914,732	Oct. 21, 1975	B 405,137	3,915,566	Oct. 28, 1975
B 381,847	3,921,152	Nov. 18, 1975	B 405,160	3,924,821	Dec. 9, 1975
B 382,018	3,929,742	Dec. 30, 1975	B 405,248	3,926,294	Dec. 16, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER TRIAL VOLUNTARY PROTEST PROGRAM

JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 405,305	3,922,111	Nov. 25, 1975
B 405,360	3,913,403	Oct. 21, 1975
B 405,495	3,924,577	Dec. 9, 1975
B 405,938	3,920,109	Nov. 18, 1975
B 406,065	3,914,199	Oct. 21, 1975
B 406,357	3,924,529	Dec. 9, 1975
B 406,800	3,952,708	Apr. 27, 1976
B 407,357	3,924,614	Dec. 9, 1975
B 407,728	3,925,240	Dec. 9, 1975
B 407,736	3,924,463	Dec. 9, 1975
B 408,380	3,984,172	Oct. 5, 1976
B 408,487	3,924,046	Dec. 2, 1975
B 408,749	3,914,116	Oct. 21, 1975
B 409,026	3,925,497	Dec. 9, 1975
B 409,220	3,915,648	Oct. 28, 1975
B 409,251	3,922,620	Nov. 25, 1975
B 409,657	3,927,362	Dec. 16, 1975
B 409,816	3,921,317	Nov. 25, 1975
B 410,062	3,923,855	Dec. 2, 1975
B 410,168	3,914,717	Oct. 21, 1975
B 411,145	3,914,168	Oct. 21, 1975
B 411,356	3,919,649	Nov. 11, 1975
B 411,483	3,925,196	Dec. 9, 1975
B 411,633	3,914,741	Oct. 21, 1975
B 412,516	3,927,417	Dec. 16, 1975
B 412,619	3,925,292	Dec. 9, 1975
B 412,867	3,924,587	Dec. 9, 1975
B 413,006	3,914,850	Oct. 28, 1975
B 413,546	3,924,314	Dec. 9, 1975
B 414,129	3,925,484	Dec. 9, 1975
B 414,288	3,925,537	Dec. 9, 1975
B 415,113	3,915,717	Oct. 28, 1975
B 415,124	3,915,944	Oct. 28, 1975
B 415,845	3,925,076	Dec. 9, 1975
B 415,847	3,914,208	Oct. 21, 1975
B 415,957	3,925,635	Dec. 9, 1975
B 415,977	3,927,359	Dec. 16, 1975
B 416,598	3,923,473	Dec. 2, 1975
B 416,710	3,923,746	Dec. 2, 1975
B 416,832	3,924,975	Dec. 9, 1975
B 416,933	3,924,968	Dec. 9, 1975
B 417,299	3,918,235	Nov. 11, 1975
B 418,121	3,925,023	Dec. 9, 1975
B 418,153	3,925,251	Dec. 9, 1975
B 418,302	3,913,252	Oct. 21, 1975
B 419,327	3,921,197	Nov. 18, 1975
B 419,481	3,924,970	Dec. 9, 1975
B 420,016	3,914,572	Oct. 21, 1975
B 420,148	3,927,414	Dec. 16, 1975
B 420,514	3,923,929	Dec. 2, 1975
B 420,568	3,925,069	Dec. 9, 1975
B 421,026	3,914,785	Oct. 21, 1975
B 421,362	3,924,817	Dec. 9, 1975
B 421,383	3,925,047	Dec. 9, 1975
B 421,797	3,914,023	Oct. 21, 1975
B 422,399	3,928,656	Dec. 23, 1975
B 422,467	3,924,804	Dec. 9, 1975
B 422,949	3,921,873	Nov. 25, 1975
B 424,415	3,919,458	Nov. 11, 1975
B 424,462	3,920,522	Nov. 18, 1975
B 424,572	3,924,979	Dec. 9, 1975
B 424,748	3,924,395	Dec. 9, 1975
B 425,035	3,914,025	Oct. 21, 1975
B 425,345	3,922,015	Nov. 25, 1975
B 425,470	3,923,796	Dec. 2, 1975
B 425,539	3,916,742	Nov. 4, 1975
B 425,541	3,914,051	Oct. 21, 1975
B 425,572	3,923,822	Dec. 2, 1975
B 425,770	3,989,817	Nov. 2, 1976
B 427,631	3,921,433	Nov. 25, 1975
B 428,177	3,914,624	Oct. 21, 1975
B 428,795	3,921,056	Nov. 18, 1975
B 429,442	3,923,485	Dec. 2, 1975
B 430,106	3,918,941	Nov. 11, 1975
B 430,140	3,922,084	Nov. 25, 1975
B 430,149	4,037,175	July 19, 1977
B 430,385	4,001,104	Jan. 4, 1977
B 430,798	3,918,204	Nov. 11, 1975
B 430,944	3,922,096	Nov. 25, 1975
B 432,373	3,919,670	Nov. 11, 1975
B 433,587	3,914,567	Oct. 21, 1975
B 435,343	3,919,244	Nov. 11, 1975
B 435,844	3,925,170	Dec. 9, 1975
B 437,172	3,913,251	Oct. 21, 1975
B 437,173	3,924,627	Dec. 9, 1975
B 437,195	3,914,618	Oct. 21, 1975
B 437,450	3,922,479	Nov. 25, 1975
B 438,053	3,916,013	Oct. 28, 1975
B 438,706	3,925,050	Dec. 9, 1975
B 439,168	3,919,676	Nov. 11, 1975
B 439,669	3,921,499	Nov. 25, 1975
B 440,898	3,921,789	Nov. 25, 1975
B 441,024	3,913,629	Oct. 21, 1975
B 441,416	3,913,851	Oct. 21, 1975
B 442,280	3,914,054	Oct. 21, 1975
B 442,859	3,918,570	Nov. 11, 1975
B 442,919	3,925,483	Dec. 9, 1975
B 444,614	3,927,996	Dec. 23, 1975
B 445,471	3,914,711	Oct. 21, 1975
B 445,740	3,923,612	Dec. 2, 1975
B 447,417	4,024,727	May 24, 1977
B 448,571	3,924,760	Dec. 9, 1975
B 449,647	3,916,797	Nov. 4, 1975
B 450,499	3,920,526	Nov. 18, 1975
B 450,546	3,924,417	Dec. 9, 1975
B 450,927	3,913,844	Oct. 21, 1975
B 455,520	3,922,543	Nov. 25, 1975
B 455,775	3,914,356	Oct. 21, 1975
B 456,346	3,914,531	Oct. 21, 1975
B 459,425	3,928,773	Dec. 23, 1975
B 461,872	3,919,586	Nov. 11, 1975
B 467,684	3,915,119	Oct. 28, 1975
B 468,198	3,925,340	Dec. 9, 1975

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 4TH DAY OF OCTOBER, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Albarino, Robert Vincent; and Hart, Arthur Clifford, Jr., to Bell Telephone Laboratories, Incorporated. Coating of fiber waveguides. T963,002, 10-4-77, Cl. 65-3.00R.

Bell Telephone Laboratories, Incorporated: *See*—
Albarino, Robert Vincent; and Hart, Arthur Clifford, Jr., T963,002, Cl. 65-3.00R.
Everhart, Joseph Robert; Genaro, Donald Michael; Stokes, Rembert Ryan; Sylvester, Gordon Elliot; and Tilley, Alvin Richard, T963,001, Cl. 14-63.000.

Everhart, Joseph Robert; Genaro, Donald Michael; Stokes, Rembert Ryan; Sylvester, Gordon Elliot; and Tilley, Alvin Richard, to Bell Telephone Laboratories, Incorporated. Telephone handset. T963,001, 10-4-77, Cl. 14-63.000.

Ford Motor Company: *See*—
Van Wicklin, Warren A., Jr., T963,004, Cl. 152-158.000.

Genaro, Donald Michael: *See*—
Everhart, Joseph Robert; Genaro, Donald Michael; Stokes, Rembert Ryan; Sylvester, Gordon Elliot; and Tilley, Alvin Richard, T963,001, Cl. 14-63.000.

Hart, Arthur Clifford, Jr.: *See*—
Albarino, Robert Vincent; and Hart, Arthur Clifford, Jr., T963,002, Cl. 65-3.00R.

Mangus, James D.: *See*—
Schrock, Steven L.; and Mangus, James D., T963,003, Cl. 73-40.700.

Schrock, Steven L.; and Mangus, James D., to Westinghouse Electric Corportion. Method and apparatus for locating a defective tube of a liquid metal-to-water tube type heat exchanger. T963,003, 10-4-77, Cl. 73-40.700.

Stokes, Rembert Ryan: *See*—
Everhart, Joseph Robert; Genaro, Donald Michael; Stokes, Rembert Ryan; Sylvester, Gordon Elliot; and Tilley, Alvin Richard, T963,001, Cl. 14-63.000.

Sylvester, Gordon Elliot: *See*—
Everhart, Joseph Robert; Genaro, Donald Michael; Stokes, Rembert Ryan; Sylvester, Gordon Elliot; and Tilley, Alvin Richard, T963,001, Cl. 14-63.000.

Tilley, Alvin Richard: *See*—
Everhart, Joseph Robert; Genaro, Donald Michael; Stokes, Rembert Ryan; Sylvester, Gordon Elliot; and Tilley, Alvin Richard, T963,001, Cl. 14-63.000.

Van Wicklin, Warren A., Jr., to Ford Motor Company. Run-flat system for a vehicle wheel. T963,004, 10-4-77, Cl. 152-158.000.

Westinghouse Electric Corportion: *See*—
Schrock, Steven L.; and Mangus, James D., T963,003, Cl. 73-40.700.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF OCTOBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bethlehem Steel Corporation: *See*—
Homberg, Otto A.; Sheldrake, Charles W.; and Singleton, Alan H., Re. 29,428, Cl. 423-228.000.

Bognaes, Ragnar; and Solberg, Olav, to Kvaerner Brug AS. Tank construction for liquified and/or compressed gas. Re. 29,424, Cl. 62-55.000.

Cunningham, Walter F., to Superior Tabbies, Incorporated. Index tabs. Re. 29,422, Cl. 40-2.00R.

Desai, Ashok K., to Pertec Computer Corporation. Phase-locked loop for an electronic sectoring scheme for rotating magnetic memory. Re. 29,431, Cl. 360-51.000.

Emerson Electric Co.: *See*—
Plasko, Emil Robert, Re. 29,430, Cl. 337-163.000.

Engebretsen, Einar O., to Hobart Corporation. Trash compactor and bag system. Re. 29,425, Cl. 100-215.000.

Fujita, Kinji, to Kabushiki Kaisha Suwa Seikosha. Time correction device for digital watches. Re. 29,423, Cl. 58-50.00R.

Hobart Corporation: *See*—
Engebretsen, Einar O., Re. 29,425, Cl. 100-215.000.

Homberg, Otto A.; Sheldrake, Charles W.; and Singleton, Alan H., to Bethlehem Steel Corporation. Regeneration of alkanolamine absorbing solution in gas sweetening processes. Re. 29,428, Cl. 423-228.000.

Kabushiki Kaisha Suwa Seikosha: *See*—
Fujita, Kinji, Re. 29,423, Cl. 58-50.00R.
Kawai, Masanori; Takada, Haruo; and Kobayashi, Shinkichi, Re. 29,429, Cl. 310-348.000.

Kawai, Masanori; Takada, Haruo; and Kobayashi, Shinkichi, to Kabushiki Kaisha Suwa Seikosha. Oscillator for a timepiece. Re. 29,429, Cl. 310-348.000.

Kobayashi, Shinkichi: *See*—
Kawai, Masanori; Takada, Haruo; and Kobayashi, Shinkichi, Re. 29,429, Cl. 310-348.000.

Kvaerner Brug AS: *See*—
Bognaes, Ragnar; and Solberg, Olav, Re. 29,424, Cl. 62-55.000.

Lariviere widow Giroux, Alice Louise Rosalie. Safety stopping device for marine engines. Re. 29,426, Cl. 123-148.00S.

Matsushita Electric Industrial Co., Ltd.: *See*—
Sekine, Yoichi, Re. 29,427, Cl. 204-2.000.

Pertec Computer Corporation: *See*—
Desai, Ashok K., Re. 29,431, Cl. 360-51.000.

Plasko, Emil Robert, to Emerson Electric Co. Thermal limiter for one or more electrical circuits and method of making the same. Re. 29,430, Cl. 337-163.000.

Sekine, Yoichi, to Matsushita Electric Industrial Co., Ltd. Electrorecording paper. Re. 29,427, Cl. 204-2.000.

Sheldrake, Charles W.: *See*—
Homberg, Otto A.; Sheldrake, Charles W.; and Singleton, Alan H., Re. 29,428, Cl. 423-228.000.

Singleton, Alan H.: *See*—
Homberg, Otto A.; Sheldrake, Charles W.; and Singleton, Alan H., Re. 29,428, Cl. 423-228.000.

Solberg, Olav: *See*—
Bognaes, Ragnar; and Solberg, Olav, Re. 29,424, Cl. 62-55.000.

Superior Tabbies, Incorporated: *See*—
Cunningham, Walter F., Re. 29,422, Cl. 40-2.00R.

Takada, Haruo: *See*—
Kawai, Masanori; Takada, Haruo; and Kobayashi, Shinkichi, Re. 29,429, Cl. 310-348.000.

LIST OF PLANT PATENTEES

Flemer, William, III, to Treesearch. Vine — *Campsis radicans*. 4,119, 10-4-77, Cl. 54.000.

Ikuta, Hideo: *See*—
Ito, Tokuyasu; and Ikuta, Hideo, 4,117, Cl. 88.000.

Ito, Tokuyasu; and Ikuta, Hideo. Rubber plant (*Ficus elastica*). 4,117, 10-4-77, Cl. 88.000.

Pan-American Plant Company: *See*—
Shoesmith, Leonard H., 4,120, Cl. 74.000.

Ruehle, Elmer C. Pistachio tree. 4,118, 10-4-77, Cl. 30.000.

Shoesmith, Leonard H., to Pan-American Plant Company. Chrysanthemum plant named pink concord. 4,120, 10-4-77, Cl. 74.000.

Stark Brothers Nurseries & Orchards Company: *See*—
Ten Hove, Hendrik Willem, 4,121, Cl. 34.000.

Ten Hove, Hendrik Willem, to Stark Brothers Nurseries & Orchards Company. Apple tree—Royal Gala variety. 4,121, 10-4-77, Cl. 34.000.

Treesearch: *See*—
Flemer, William, III, 4,119, Cl. 54.000.

LIST OF DESIGN PATENTEES

A.V./American Ventures, Inc.: *See*—
Vasilatos, Anastasios J.; and Nagele, Albert L., 245,973, Cl. D12-69.000.
Vasilatos, Anastasios J.; and Nagele, Albert L., 245,974, Cl. D12-69.000.

AAI Corporation: *See*—
Barr, Irwin R., 245,997, Cl. D25-21.000.

Akazawa, Toshimasa, to Matsushita Electric Industrial Co., Ltd. Combined tape recorder, tuner and amplifier. 245,978, 10-4-77, Cl. D14-5.000.

American Home Products Corporation: *See*—
Zephries, Z. George, 245,959, Cl. D7-137.000.
Zephries, Z. George, 245,960, Cl. D7-137.000.
Zephries, Z. George, 245,961, Cl. D7-150.000.

Amey, Aubrey, deceased; and by Beckner, Greta A., administratrix. Ottoman. 245,949, 10-4-77, Cl. D6-36.000.

Amey, Aubrey, deceased; and by Beckner, Greta A., administratrix. Chair. 245,955, 10-4-77, Cl. D6-78.000.

Anderson, Robert K.; and Stuver, Richard L. Combined burner blower and support stand for simulated logs. 245,993, 10-4-77, Cl. D23-93.000.

Anjar, Inc.: *See*—
Hahne, Dieter; Stohr, Jurgen; and Ulrich, Hans-R., 246,002, Cl. D34-5.0BB.

Arbrook, Inc.: *See*—
Schmidt, George H., 245,976, Cl. D13-6.000.

Astro-Die, Ltd.: *See*—
Goff, Lois, 246,004, Cl. D34-5.0DT.

Barr, Irwin R., to AAI Corporation. Solar building. 245,997, 10-4-77, Cl. D25-21.000.

Beckner, Greta A., administratrix: *See*—
Amey, Aubrey, deceased; and Beckner, Greta A., administratrix, 245,949, Cl. D6-36.000.
Amey, Aubrey, deceased; and Beckner, Greta A., administratrix, 245,955, Cl. D6-78.000.

Brandt, Michael W. Pour spout perforating tool. 245,962, 10-4-77, Cl. D8-41.000.

Burr, Alvin L.; and Burr, Virginia H. Ball rolling game stick. 246,006, 10-4-77, Cl. D34-5.0HP.

Burr, Virginia H.: *See*—
Burr, Alvin L.; and Burr, Virginia H., 246,006, Cl. D34-5.0HP.

Callecod, Robert L., to Recreation Systems Co. Child recreation structure. 246,005, 10-4-77, Cl. D34-5.00H.

Carroll, John Warren. Serial printer or similar article. 246,007, 10-4-77, Cl. D64-11.00R.

Chartier, Guy Norman, to Guy-Chart Tools Limited. Trammel gauge. 245,967, 10-4-77, Cl. D10-61.000.

Cordell, Carl R., Jr. Fishing lure. 245,990, 10-4-77, Cl. D22-28.000.

Dango, Geronimo. Sheet material holder. 245,989, 10-4-77, Cl. D19-91.000.

De Sede AG: *See*—
Luthy, Ernst, 245,952, Cl. D6-56.000.

Denny, Thomas M.: *See*—
Stone, Lawrence J.; and Denny, Thomas M., 245,983, Cl. D15-30.000.

Draper, Earle Sumner, Jr. Convertible modular mobile home. 245,995, 10-4-77, Cl. D25-17.000.

Dunchock, Richard S., to Optarac Corporation. Eyeglass display unit. 245,956, 10-4-77, Cl. D6-85.000.

Eastman Kodak Company: *See*—
Olson, Richard Joseph, 245,987, Cl. D16-32.000.

Ethyl Development Corporation: *See*—
Lewman, John W., 245,963, Cl. D9-143.000.

Finkel, Henry, to International Business Relations Bureau Inc. Thermometer. 245,966, 10-4-77, Cl. D10-58.000.

Finley, Betty. Tennis ball pouch with belt clip. 245,947, 10-4-77, Cl. D2-400.000.

Fuji Photo Film Co., Ltd.: *See*—
Fukuda, Hiroshi, 245,986, Cl. D16-06.000.

Fukuda, Hiroshi, to Fuji Photo Film Co., Ltd. Camera. 245,986, 10-4-77, Cl. D16-06.000.

Fukuda, Kiyoshi; and Takano, Kimio, to Matsushita Electric Industrial Co., Ltd. Portable radio receiver. 245,979, 10-4-77, Cl. D14-68.000.

Fukuoka, Tatsuo. Shoe. 245,946, 10-4-77, Cl. D2-308.000.

General Electric Company: *See*—
Ludwick, Ellen V. B., 245,981, Cl. D14-73.000.

Goff, Lois, to Astro-Die, Ltd. Dodecahedron astrological die. 246,004, 10-4-77, Cl. D34-5.0DT.

Gravel, Jean Guy. Collar for gas tank filling pipes of service stations. 245,991, 10-4-77, Cl. D23-41.000.

Gruber, Morton A. Incense holder. 245,992, 10-4-77, Cl. D23-78.000.

Guy-Chart Tools Limited: *See*—
Chartier, Guy Norman, 245,967, Cl. D10-61.000.

Hahne, Dieter; Stohr, Jurgen; and Ulrich, Hans-R., to Anjar, Inc. Apparatus for playing a game. 246,002, 10-4-77, Cl. D34-5.0BB.

Hanson Limited: *See*—
Mox, Dana W., 245,968, Cl. D10-91.000.
Mox, Dana W., 245,969, Cl. D10-91.000.

Havstad, Harold R., to Hudson Oxygen Therapy Sales Company. Oxygen analyzer housing. 245,965, 10-4-77, Cl. D10-46.000.

Hudson Oxygen Therapy Sales Company: *See*—
Havstad, Harold R., 245,965, Cl. D10-46.000.

Igo, Toshio; and Koda, Hironosuke, to Matsushita Electric Industrial Co., Ltd. Portable radio receiver. 245,980, 10-4-77, Cl. D14-68.000.

Interlemo Holding S.A.: *See*—
Mouttet, Leon, 245,977, Cl. D13-24.000.

International Business Relations Bureau Inc.: *See*—
Finkel, Henry, 245,966, Cl. D10-58.000.

Kameyama Candle Co., Ltd.: *See*—
Tanikawa, Masashi, 246,008, Cl. D73-1.00R.
Tanikawa, Masashi, 246,009, Cl. D73-1.00R.
Tanikawa, Masashi, 246,010, Cl. D73-1.00R.

Kifer, Gary Wayne. Lifting tongs. 245,972, 10-4-77, Cl. D12-54.000.

Koda, Hironosuke: *See*—
Igo, Toshio; and Koda, Hironosuke, 245,980, Cl. D14-68.000.

Lande, Gerald L. Combined sectional sofa and multiple table unit. 245,951, 10-4-77, Cl. D6-46.000.

Lewman, John W., to Ethyl Development Corporation. Bottle or similar article. 245,963, 10-4-77, Cl. D9-143.000.

Ludwick, Ellen V. B., to General Electric Company. Digital clock radio. 245,981, 10-4-77, Cl. D14-73.000.

Lukens, William W. Greenhouse. 245,996, 10-4-77, Cl. D25-15.000.

Luthy, Ernst, to De Sede AG. Chair. 245,952, 10-4-77, Cl. D6-56.000.

Martens, Melvin R. Collapsible cart. 245,971, 10-4-77, Cl. D12-24.000.

Massey-Ferguson Inc.: *See*—
Stone, Lawrence J.; and Denny, Thomas M., 245,983, Cl. D15-30.000.

Mathur, Florence M. Chair. 245,950, 10-4-77, Cl. D6-37.000.

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Norton Company: *See*—
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Dunchock, Richard S., 245,956, Cl. D6-85.000.
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Stohr, Jurgen: *See*—
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Stuver, Richard L.: *See*—
Anderson, Robert K.; and Stuver, Richard L., 245,993, Cl. D23-93.000.
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NOTE.—First number, class; second number, subclass; third number, patent number

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CLASS 222

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945 4,052,487
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CLASS 303

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341 4,052,037

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74 245,954
78 245,955
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PATENTS

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	4,052,569		4,051,911		4,052,682		4,052,713		4,051,973		4,052,011
	4,052,648		4,051,941		4,052,694	10 :	4,052,332		4,051,982		4,052,414
2 :	4,051,837		4,051,983		4,052,697		4,052,440		4,051,985		4,052,505
	4,052,136		4,052,000		4,052,698	12 :	4,051,577		4,051,995		4,052,716
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	4,051,833		4,052,628		4,052,466		4,051,845		4,051,792		4,052,056
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